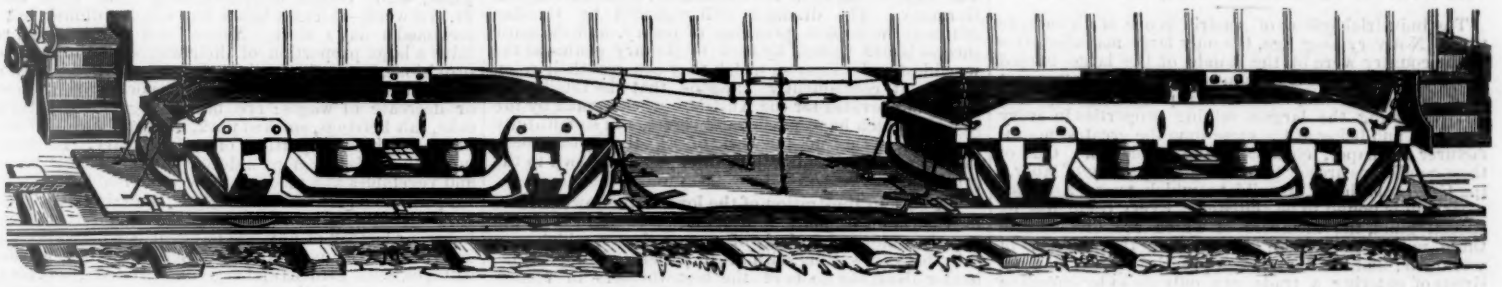
RAILROAD GAZETTE

A Journal of Transportation, Engineering and Railroad News.

QUARTO VOL. II.—NO. 1. Fourteenth Year. | CHICAGO, SATURDAY, OCTOBER 1, 1870. | $3.00 per Annum, until 1871. $4 per Annum, thereafter.

PLATFORMS UNDER PASSENGER TRAINS.

All appliances which tend to lessen the discomforts of traveling are welcomed by a very large class of the community—both by railroad men and traveling men and women, as well as by those occasional travelers whose complaints are apt to be loudest and most unreasonable. Blasts of hot air coming in at windows or through ventilators are patiently endured by reasonable men as being a more or less necessary consequence of the heated term, but when the air enters laden with dust which the motion of the train has drawn up from the ballast, the order of things is reversed and unmeasured "heated terms" are the consequence, not the cause. Ingenious inventors have tried in various ways to avoid this disagreeable feature, both by purifying the air as it enters the car, and by preventing the dust from rising about the windows by shrouding the lower part of the car down to a point very near the surface of the track with a sort of stiffened curtain commonly known as a "petticoat." This latter system has been thoroughly tried on some Missouri roads, on the Northwestern and, we believe, by several other companies, and was at first very favorably regarded, as it kept down the dust and to a great extent hushed the clatter of the trucks. Travelers were delighted with the plan, but the companies found it too expensive a luxury and have generally abandoned it, as the dust confined under the car found its way into the journal-boxes and all frictional parts causing a ruinous wear and resistance to motion.



Dust-Arresting Platform under Passenger Trains.

The attractive features of the "petticoat" plan, as well as the obstacles to its general adoption, have been carefully studied by the inventor who presents the substitute for it herewith illustrated. It is proposed to hang a light platform underneath each truck, about six inches above the surface of the rails, fitted as closely as possible to the wheels, and connected under each car by a third platform supported by some flexible attachment from the body of the car and pivoted to each of those beneath the trucks. At the forward end of each car another platform is hinged transversely to the truck platform, so as to be thrown over back out of the way when the car is uncoupled, or thrown forward so as to cover the intervening space when the train is made up. The truck platforms are constructed in three parts: the web beneath the centre of the car, and the strips outside the wheels, which are so locked to the web as to be detached at pleasure, when the platform can be removed.

The advantage of this continuous platform beneath the trains will be apparent: The dust is confined, not only beneath the windows and ventilators, but also out of the way of the journal-boxes and wearing parts of the truck, and it will also be found practically impossible for the careless passenger to fall underneath the wheels in getting on or off the cars.

A set of these platforms is now being adapted to an entire train on one of our western roads, and the results of the experiment will be looked for with considerable interest.

The inventor of this and of several other valuable improvements is Mr. W. M. K. Thornton, of Rolla, Missouri.

THE Sacramento *Record* suggests that narrow gauge railroads would prove practicable and profitable in some of the mining districts of California where the ordinary roads are abominable and the traffic light and not bulky.

Contributions.

USE OF THE INDICATOR ON LOCOMOTIVES.

BY P. BARNES, JR.

It would not be safe to say that the use of the indicator, even in the best hands, would prove a means of relief from more than a small part of the difficulties which beset the nerves of steam power, and especially the locomotive builders and master mechanics of the present day, to whom is committed the management of that most efficient but costly form of engine. In stationary engines, for which nearly any requisite amount of room may be had and which generally may be conveniently repaired, there are various special and highly useful arrangements of valve gear in well approved use, and to the employment of these devices the use of the indicator, rightly interpreted, has led the way. In locomotives, however, few refinements are admissible that involve more than the very smallest number of parts and that ever incur more than the least necessity for repairs.

Hence the indicator, showing as it does, just when the nearest practical approach to theoretical perfection has been attained, can often, where applied to locomotives, show only how very desirable it would be to adapt to them some form of valve gear which experience has shown to be inadmissible, even though, when attached to a fixed engine, it may have proved to be almost simplicity itself.

It is hardly true, however, that the use of the indicator on locomotives can lead to no good results, because in any machine a distinction must exist between useful and prejudicial resistances, or, in other words, between useful and lost work; and however great the proportion of useful work may be, the surest means of finding out how to increase it is to study carefully, and to account for, as far as possible, all sources of loss or causes of prejudicial resistances, and the indicator rightly used may serve to show these sources of loss.

The indicator, in any case, will reveal the way in which the steam is used during the time it is within the cylinder, and its passages, but it gives no light upon the question, perhaps even a more important one, of the production of steam in the boiler, and also of the construction of the locomotive as a carriage, and the adaptation or repair of the moving parts, by which the energy of the steam is transformed into a motion of the whole structure upon the rails. And the discussion of these points is worthy of distinct and special attention.

One of the things most noticeably and clearly shown upon any indicator diagram, taken from a locomotive, is the comparative resistance which the steam encounters in escaping from the cylinder, or, in other words, the lost work, due to the back pressure against the piston during its stroke. It is true that a part of this back pressure, and the useful effect which is lost thereby, are compensated for by the useful effect gained by the cushioning or gradual bringing to rest of the reciprocating parts in their rapid motion, but how far this cushioning may be replaced by a more exact and effective system of counter balancing, and of proportioning the weight of the reciprocating parts, is a problem which, for the locomotive, deserves the most careful study. The back pressure, caused by exhaust nozzles which are too much contracted, or from that device now nearly gone out of use—the single-exhaust nozzle—or from a pinched passage through the cylinder openings, is, in nearly every case, within easy remedy, and is most unmistakably shown by the application of a good indicator, though it can hardly be estimated in amount or even detected at all by any other means whatever.

The existence of losses by leakage past the piston packing and under the valves is more surely detected and remedied by simple observation, but the actual amount of such losses can be learned only from a minute inspection of the diagram and a comparison of the curve drawn by the indicator pencil with that which is shown by actual calculation to be the curve that would be drawn by the pencil if no such losses occured.

The question of a choice of piston packing is one which depends not only upon convenience of mechanical detail, but also upon the decrease of lightness which may be maintained constantly with the least expense in the cylinder; since a slight leakage only, which, with many engineers, might remain long undetected, with in a very few weeks eats up any saving of first cost of adjustment or of frequent examination which some imperfect form of packing might effect.

Another source of loss, which is probably more common than is supposed, is that due to the imperfect distribution of the steam resulting from the springing or bending of parts of the valve gear, or from the wearing of pins; and any departure from the true form of diagram which experience has shown to be given by the best engines when working perfectly, that may be due to these derangements is shown almost without possibility of mistake upon a diagram.

In effect, then, it is safe to say that the indicator, in skillful hands, is an important help in the advancement of locomotive engineering, and that no master mechanic can afford to ignore the existence or neglect the use of so useful a means of discovering and remedying errors of construction or of adjustment; and also that in proportion as the intelligent use of this and similar available instruments is extended so will the advancement of all mechanical science in economy and efficiency be favored and stimulated.

Formula for the Easy Calculation of Earthwork Tables.

BY T. J. NICHOLL, C. E.

About the first thing a railroad or canal engineer has to do, after his work is cross-sectioned, is to make tables of excavations and embankments for the slopes and bases used. For the benefit of such, I will give my formula for calculating tables of earthwork, of any slope or base. By this method an engineer can make tables in half a day that would, by any other, take three days, not excepting the one by Mr. Griffin, published in the RAILROAD GAZETTE, September 10.

Now let C=cubical contents in feet of a prism 100 feet long of any slope or base and one-tenth of a foot deep. C'=0.2 feet, C''=0.3 feet, C'''=0.4 feet, and S=ratio of slope multiplied by two. The following is the formula:

$C+C+S=C'$,

$C'+C+(S\times 2)=C''$,

$C''+C+(S\times 3)=C'''$,

which can be continued in the same manner *ad infinitum*. Now, to apply the formula, let us suppose it is required

to compute tables for excavating prisms 100 feet long, base 20 feet, slopes 1½ to 1. By any method find the cubical contents in feet for a prism of the above form 0.1 feet deep, which will equal 201.5 feet=C; and ratio of slope, 1½×2=3=S.

EXAMPLE 1.

201.5=C= contents for 0.1ft. deep.

201.5+201.5+(3)=406.0=C' " " 0.2 "
406.0+201.5+(3×2)=613.5=C'' " " 0.3 "
613.5+201.5+(3×3)=824.0=C''' " " 0.4 "

and so on to any depth.

EXAMPLE 2.

Embankment: Prisms 100 feet, base 12 feet, slopes 3¼ to 1. C=120.75ft. S=¾×2=1.5.

120.75=C=contents for 0.1ft. high.

120.75+120.75+(1.5)=243.00=C'=contents for 0.2 ft. high.

243.00+120.75+(1.5×2)=366.75=C''=contents for 0.3 feet high.

366.75+120.75+(1.5×3)=492.00=C'''=contents for 0.4 feet high.

492.00+120.75+(1.5×4)=618.75=contents for 0.5 feet high.

To insure accuracy in calculating these tables, it is well to calculate each foot by the prismoidal formula; then if you have made an error it will be detected. I leave it with the person using my formula as to what arrangement he shall make, but would suggest the use of two columns only. Thus, using the figures above:

Contents.	Depth in Feet.
120.75=	0.1
120.75	
1.5	
243.00=	0.2
120.75	
3.00	
366.75=	0.3
120.75	
4.50	
492.00=	0.4
120.75	
6.00	
618.75=	0.5

The Artisan in Austria, Russia, and Sweden.

The industrial system of Austria is one of an antique type. Not very long ago, the only large manufactories in the country were in the hands of the large landed proprietors, or the Government itself; the latter not only holding the salt, tobacco, and powder monopolies, but possessing the largest mining properties in every province, and being at the same time the greatest manufacturer in paper, chemicals, and porcelain. Out of these conditions arose "that ancient hierarchy of labor," the Genossenschaft, or guild, to which every Austrian workman is bound to be affiliated. Every trade has its special guild, the members of which are divided into three ranks—the upper, of masters; the middle, of workmen; and the lower, of apprentices. Any one desirous of entering a trade can only do so by enrolling himself among the apprentices of the guild of the particular craft he selects, paying thereupon the fee of three florins (nearly $1.50), one third of which goes to the funds of the guild, the rest passing to the Chambers of Commerce and Industry for the weekly lectures and Sunday schools they provide for the instruction of apprentices. The apprentice is then assigned to a master, whom he has to serve without payment for two, three, or four years. If at the end of that term he obtains a certificate of proficiency from the schools he has attended, his master proclaims him a free member of the guild, and he is registered as a workman on its books—the registration costing him another three florins. In return for a quarterly payment of twenty-eight cents he becomes entitled to gratuitous board, lodging, and medical care at the hospital during sickness, or to receive the same at his own home, at a charge of eighty-seven cents a week. If the workman wishes to become a master, he pays twenty florins to the Master's Chest, six florins for a diploma, and a little less than half that amount to the town rates, and receives the coveted promotion, and becomes an elector of his guild.

The guild system, whatever be its faults, turns out good workmen, who command, according to the German standard, good pay; for example, shoemakers earn $6 a week; joiners, $7.50 to $15; tailors, $6 to $9; silversmiths, $3.50 to $5; compositors, $6; meerschaum carvers, $4 to $9; plumbers, $4; and smiths, $6 to $9—twelve hours being the average working day. As to the food and lodging of the Austrian artisan, little can be said, as the information at hand is very scanty. In Vienna, where house rent is very high, it is difficult to obtain a small room, with the use of a kitchen, for $48.00 per annum. About seventeen per cent. of the industrial population are provided with lodging by their employers, some few of whom build houses, which their workmen buy gradually with the rent they pay. Thirteen per cent. are wholly or partially boarded by their masters; some receive gardens rent free; and in some factories the hands obtain obtain food at wholesale prices. The owner of every large factory is bound by law to maintain, either with the co-operation of his work-people, in partnership with other manufacturers, or at his own expense, a permanent fund for the relief of those stricken down by accident or disease. Strikes, lock-outs and all combinations for the restraint of trade being illegal in Austria, what we call trades' unions are non-existent there; but co-operative associations flourish, their number having quadrupled in the two years ending 1868. Of the 671 associations then in being, 418 were loan and discount banks, 237 co-operative stores societies, and 16 wholesale produce associations. Disputes respecting wages, work, contracts, and claims upon benefit funds are settled by Boards of Conciliation and Courts of Arbitration, consisting of twelve or twenty-four members—one-half employers elected by employers, the other half workmen elected by workmen; the latter being paid, while sitting in judgment, by the commune.

In 1869, national education was made compulsory in Austria. By this law, every child must attend school from the age of six to that of fourteen, and even beyond that age, unless it is certified that he has acquired the full minimum of education considered necessary for every citizen. The course consists of reading, writing, arithmetic, a sound knowledge of the native language and the native history, geography, physical science, geometry, singing, and athletic exercises. Children employed in factories are exempt from attendance at the communal school, provided that they obtain the required amount of education at a special school of their employers; and wherever a special trade school exists an employer is obliged to send all his apprentices to it. At the same time, every child is provided with religious instruction in the creed to which he or she is born, the local authorities of the religious community to which the child belongs being bound to provide certified competent teachers; upon their default the State steps in and undertakes the duty for them. This religious education is kept apart from the secular education, and is not permitted in any way to interfere with it. The future of the Austrian artisan promises well, for even without such advantages as the rising generation will enjoy, he is a credit to his country. Mr. Lytton was astonished by their culture and refinement. He says: "I have never yet met with any of the better class of Vienna workingmen unable to read and write correctly, or ignorant of at least the master-pieces of the literary genius of Germany....On subjects of political and economical science, the Austrian workingman is probably worse informed than the English. I must, however, bear witness to the fact, that at workingmen's meetings in this city I have frequently listened to speeches delivered by workingmen with an eloquence of utterance, a correctness of expression and a dignity of gesture which would be effective in any public assembly. As the German race is not remarkable either for natural eloquence or natural grace of manner, I cannot but attribute this fact to a certain degree of culture. But to what must that culture be attributed? Where and how has it been acquired?

Mr. Lytton answers his own question in a way that may shock some good folks, but it is very suggestive. "The Austrian workman's daily life is subject to the incalculable influence of two great agents of refinement—the theater and the concert room, music and the drama. The stage is still an active educational agent throughout Germany. The drama is still regarded by German critics as the noblest province of poetry, and dramatic success is still valued by men of literary genius as the worthiest and widest on which they can rest their reputation. It consequently happens that the intellectual pabulum provided for the Austrian workingman by the theater, which he so passionately loves, and so faithfully frequents, is the master-work of all the great poets, thinkers, and men of letters from Goethe down to the present day.

"A curious illustration of the love of the lower orders in Austria for dramatic representation is afforded by the crowds, composed entirely of poorer classes, which may daily be seen waiting with great patience and good behavior about the doors of the best theaters in Vienna hours before those doors are opened. It is the same as regards the opera houses; good performances of the works of the best composers are abundant and accessible to all classes at a comparatively trifling expense. At the numerous places of recreation frequented by the Austrian workingman, the chief and most general source of recreation is music—never very bad, and often very good. There are very few Austrian workingmen who cannot either sing or play on some instrument, and who do not belong either to some amateur orchestra or singing club. A certain supply of *bona fide* amusement, and relaxation of mind as well as body, is regarded by most of them as a legitimate and necessary part of their annual expenditure. And it is to the humanizing influence of this view and habit of life, rather than to any innate peculiarity of temperament, that I am disposed to attribute the geniality and kindliness of disposition, as well as the refinement of manner, which have so greatly struck me in my occasional intercourse with the Viennese workingman." After this, we are not surprised to learn that intoxication is rare, habitual drunkenness very rare among Austrian artisans, and that their ideas of intimidation are confined to sending their obnoxious fellows to Coventry.

The condition of the Russian artisan is said to have materially improved of late years, but there is plenty of room for improvement still. Owing to the climate and the severity of the winter, employment is at the best precarious, and a goodly proportion of the working-classes pass their time alternately in the towns and the country, flocking into the former with the spring, and returning to their villages as autumn draws to an end. Wages vary according to locality and the season of the year, and are lowest in the districts where handloom weavers congregate. Good mill hands in the cotton, silk, linen, cloth, and carpet trades receive from $7.50 to $15 per month; ordinary mechanics, joiners, blacksmiths, etc., are paid from 75 cents to $1.50 a day; while skilled mechanics and engine drivers can earn $1.50 to $2.50, or even more. Thirteen hours, with one for dinner, and a short rest for breakfast and an evening meal, is the average working day; that for children, of whom, however, very few are employed, being no shorter. All engagements are verbal, and cannot be broken off at less than two weeks' notice. No workman can be taken on at a factory or workshop unless he is able to produce a properly viseed passport.

Some of the mill hands live in huts like those used by the agricultural laborers, and constructed after the following fashion: Logs of red pine are cut into lengths of three, four, or five fathoms, according to the size of the house. These are placed one above the other, and the ends dovetailed together. The doors and windows are then cut out, and the pieces carefully numbered by notches, and the box of logs taken to pieces preparatory to the actual building commencing. This operation consists in placing the lowermost tier on a foundation of wooden posts and boulder stokes, adding tier after tier, filling up all the interstices with moss, or hemp and tow. The walls finished, floors and ceilings of red or white pine boards are added, both floor and ceiling being bouble, with a layer of earth between, and the whole crossed over with boards. The hut is roofed with wooden tiles. In one corner of the room—there is seldom more than one—a large brick stove, like an English baking oven, is built, a chimney of wood, or of bricks put loosely together without mortar, is carried through the roof, and the house is ready for occupancy. In large towns, however, the mill hand may lodge in large two or three storied houses, but comfort and cleanliness are out of the question. The rooms are small, low, and ill ventilated, and expected to accommodate as many as they will hold both for living and sleeping purposes—shelves and benches doing duty for beds. Except in the case of overseers and foremen, separate sleeping rooms are never thought of; and all are overcrowded. Some few manufacturers have erected large buildings, wherein the married, the single men, and the single women are separately provided for; a single man paying from 75 cents to $1.50, and the married man from $1.50 to $2.00 per month as rent, the rent being deducted from his wages. Attached to these buildings there is usually a store, under the master's control, for the sale of good provisions at reasonable rates. In the poorer districts the food of the working classes is wretched in the extreme, costing about $1.13 a head per month, and quite enough, too, since it consists of black bread, water, and a little tea occasionally. In the large towns it costs the artisan as much per week, but then his dietary is more extensive, consisting of black bread, fresh and salt fish, cabbage and meat soup, cucumbers, mushrooms and potatoes; washed down with tea, quass, and corn brandy. In Moscow and St. Petersburg, beer is indulged in; but that beverage finds small favor elsewhere, the cheap corn brandy being the prime agent in liquoring up among the workingmen who call the Czar father.

The sum of $4.25 is given as the average weekly wages of good workmen in good trades in Sweden, piece workers, however, making 25 per cent. more. In Stockholm, where the wages are highest, the following are the ruling maximum rates: Goldsmiths, $7; watchmakers, $5.50; mathematical instrument makers, $7.50; pianoforte makers, $5.25; tanners, $4.13; paper makers, $4.50; while cotton weavers seldom make more than $1.75 a week—thirteen hours, less one for dinner, being reckoned a day's work. Miners and ore smelters, receive a large proportion of their wages in the shape of provisions, any fluctuations in the market prices of necessaries being equalized by a proportionate increase or decrease of wages; rye bread, vegetables, oatmeal cake, salt herrings, smoked pork, milk, and cheese, forming the principal portion of their dietary. In Stockholm, the artisan can get a decent dinner of meat, bread, and vegetables at a moderate price, and is able to indulge in spirits to a greater extent than is desirable. In the rural districts of Sweden, almost every mine, smelting house, or factory of any size has near it houses specially designed for the use of the workmen—neat little wooden cottages, with gardens and vegetable grounds; and many proprietors permit these to pass into the actual ownership of the occupiers, taking payment by installments—no very heavy tax upon the resources of the would-be house-owner, since any careful, industrious man is held to be able to save at least one-third of his income. In the large towns detached cottages are not possible, and the lodging house system is extensively adopted. At Norkoping each house of this sort has a basement, first floor and attics, providing lodgings for twenty-four married couples, each lodging comprising one good-sized room, a larger kitchen, a small spare room, and spacious cellars for wood and fuel; and so arranged that only two sets of rooms have the same entrance door. The attics supply space for a reading room, and four chambers for unmarried men; while in front of the building is a piece of ground divided into allotments for the cultivation of flowers. At Gothenburg, a town distinguished for its efforts to house its artisans comfortably, the commune has erected, at a cost of fifteen thousand dollars, ten one-storied houses, each containing seven sets of apartments of two rooms and a kitchen, twenty-one sets of one room and a kitchen, and fourteen single rooms; the rents of these varying from $1.25 to $3.13 per month; and in another building the authorities provide accommodation for thirty-two families and forty-eight single lodgers. In the same place, a local Peabody gave a sum of $90,000 towards the erection of a superior class of lodging houses, by which four hundred and thirty persons are housed—whose movable property is insured for nearly $25,000. Such dwellings as these, of course, are inhabited by the better class of workmen; second rate ones having to content themselves with sharing a room and kitchen in houses of a humbler description.

By the law of Sweden, every engagement must be made in the presence of witnesses, and a written agreement drawn up, defining both its conditions and duration; but the latter must not exceed three years. "Masters in trades or other industrial pursuits shall provide with fatherly care that the assistants or workmen in their employ (especially those who, being minors, board and lodge in their houses) be encouraged in habits of piety, regularity, and morality; and that such as have not acquired the minimum degree of knowledge prescribed by the national school regulations, receive instruction on such days and such hours as they shall determine; and further, that their assistants or workmen diligently attend the technical Sunday schools, where such are established, or other places of instruction intended for the improvement of the industrial classes."

By another section, masters are bound to give due consideration to the health and capabilities for labor of those whom they employ. Workmen's societies for mutual aid in sickness have long existed, but what we know as trades' unions are of very recent date there; and such as exist are devoted rather to co-operative manufacture, or the intellectual improvement of the members, than to attempting to control the labor market. The Workmen's Association of Nordkoping is the most prosperous among these useful organizations. In 1867, it numbered 1,519 members, and in seven years had spent $4,500 in assisting sick members, and $1,000 in defraying funeral expenses. It has a building of its own, built at a cost of $22,500, the plans being drawn, and the edifice constructed by members only. This Association boasts not only of a library, but a theater of its own, and has in connection with it a co-operative society for the supply of necessaries, and a society of production for manufacturing articles on the co-operative system.—*Chambers' Journal.*

New Railroad Corporations in New York.

About thirty railroad companies have filed articles of association during the present year in the office of the Secretary of State at Albany, under the provisions of the General Railroad Law. The principal corporations are formed to construct short lines of road; and will depend upon the success of their directors in procuring subscriptions from the several towns along their proposed routes. Now, that this has become the established policy of the State, and there is a general law authorizing it, we may expect the rapid springing up of new companies to an indefinite extent, till some financial calamity or constitutional prohibition shall arrest the practice.

The following is a list of the companies that have been incorporated since the first day of March, 1870, in the order of the filing of their certificates:

The New York & Hempstead Plains Railroad Company; capital, $300,000.

The Black River & Morristown Railroad Company; capital, $600,000.

The Utica, Georgetown & Elmira Railroad Company; capital, $350,000.

The Central Valley Railroad Company, extending from Binghamton to Smithville Flats, in Chenango county; capital, $300,000.

The Utica, Horseheads & Elmira Railroad Company; capital, $1,000,000.

The Saratoga, Schuylerville & Hoosac Tunnel Railroad Company, extending from Saratoga Springs to Greenwich, in Washington county; capital, $300,000.

The Boston, Saratoga & Western Railroad Company, extending from Saratoga or Johnsburgh, on the Adirondack Railroad, to Sackett's Harbor and Oswego, with privilege of a branch road to Utica; capital $5,000,000.

The Rochester, Nunda & Pennsylvania Railroad Company; capital $600,000.

The Utica, Chenango & Cortland Railroad, a branch of the New York, Newburgh & Oswego Midland Railroad; capital $800,000.

The Mohawk & Iron Horse Railroad Company; capital $15 ,000.

The Grand Street, Prospect Park & Flatbush (Brooklyn) Railroad Company; capital $200,000.

The Junction Railroad Company, extending from Buffalo to Niagara Falls; capital $250,000.

The Harlem Extension Railroad Company. A consolidation of the Bennington & Rutland and the Lebanon Springs Railroad Companies.

The South Brooklyn & Park Railroad Company; capital $150,000.

The Schuylerville & Moreau Railroad Company; capital $100,000.

The Dunkirk, Warren & Pittsburgh Railroad Company. A reorganization.

The Pennsylvania & Sodus Bay Railroad, extending from Waverly, in Tioga county, to Sodus Bay, in Wayne county, forming by the Central Railroad of New Jersey and its connections a direct route to New York city; capital $1,000,000.

The Rockland Central Railroad Company; capital $500,000.

The Newburgh & Midland Railroad Company, extending from Middletown to Newburgh; capital $250,000.

The New York, Utica & Ogdensburg Railroad Company, extending by way of Monticello, Oneonta and Utica; capital $12,000,000.

The Geneva & Ithaca Railroad Company; capital $250,000.

The Smithtown & Port Jefferson Railroad Company, to be run as part of the Long Island Railroad; capital $200,000.

The Sodus Bay, Corning & New York Railroad Company; capital $1,500,000.

The Nostrand Avenue & Park (Brooklyn) Railroad Company; capital $30,000.

The Rhinebeck & Connecticut Railroad Company; capital $10,000.

The Rochester & Pine Creek Railroad Company; capital $500,000.

The New York, West Shore & Chicago Railroad Company, John M. Courtenay, John C. Jenkins and others, subscribers, extending from New York up the western shore of the Hudson to Athens, thence to Schenectady, and westward to Buffalo; capital $10,000,000.

The Schuylerville & Fort Edward Railroad Company; capital $350,000.

The Hudson Valley Railroad Company, located in Saratoga and Warren counties; capital $300,000.

Many of these companies will probably never "strike a spade," but will die making no sign. Their formation, however, shows the attention which is directed to railway enterprise.—*New York Evening Post.*

—The United States Commissioner of Patents has given a final decision refusing to extend the most important of Bessemer steel patents, which expired September 22. The process now becomes public property.

Napoleon III. and the French Railroad System.

The Emperor of the French is a captive in the hands of the great power with whom he waged an ill-advised war. His dream of ambition is over; his hope of establishing a dynasty in France has failed. Fortune, which had sustained him by her smiles, has frowned upon and disowned him. It was a bitter moment for him when he found that he had been deceived as to the real strength and the morale of his troops, and had been perhaps betrayed by those in whom he had placed implicit confidence; but his bitterest enemy could not have wished him a keener pain than that which he must have experienced when, if the reports are reliable, he addressed to the King of Belgium this telegram:

"Obliged to traverse the Belgium territory in going as a prisoner to Cassel, I beg your Majesty to authorize me to pass, accompanied by a Prussian general officer."

A prisoner in the power of Prussia, and compelled to ask of Belgium permission to pass through that neutral territory which in the secret treaty he had proposed to annex, and to travel to his destination over that railway of which but a few short months since he had desired to secure the control, and in endeavoring to obtain which he had nearly provoked a European conflict, was a position of sad and bitter humiliation.

It is not our province to deal with the great political questions which have involved the overthrow of the dynasty of the Emperor, and brought the Prussians once more to the gates of Paris; but, concerned as we are with the progress of the railway interest, we cannot forget how great is the debt which France owes to him who is now a captive for the extension of its great railway system. One of the first measures to which the Emperor directed his attention was the extension of railways in France. He took up the matter in a bold and comprehensive manner. Previous to 1852 railways had made but little progress in France—the total mileage in the country was only 2,124 miles, while in England at that date we had 6,889 opened for public traffic. There was a lamentable want of enterprise in France at that time, and confidence in railways was so small that capital could not be obtained to carry out works of this kind. The revolution of 1848 had given a decided check to the railway enterprise which was then just beginning to develop itself—many of the lines were bankrupt and the property was sequestrated, and until the year 1851 concessions for railways were entirely stopped. Some step was absolutely necessary to give life to enterprise and encourage the construction of these important public works. The Emperor saw that the French people would not take shares without a guarantee, and he promptly decided upon giving a State guarantee. The existing companies complained of the short period for which their concessions extended; the time was prolonged to ninety-nine years. The interests of the State were protected by a rigid system of government regulation and audit. The Emperor saw that several of the existing small companies were too weak to conduct the service required of them with efficiency, and he amalgamated these with other more powerful companies, and formed the whole railway system into six great companies, each having a large and distinct territory, and able by their magnitude to inspire confidence in the public, and to give assistance to the government in the future in the construction of fresh railways. The absurd system of making competing railways, which has been encouraged and fostered in this country, to the injury of the railway interest, and without corresponding benefit to the public, was not encouraged. The railway companies of France constituted, in fact, a system of carefully organized and well-regulated monopolies. The tariffs and charges were fixed by government at the lowest rates that would be remunerative, and the complete control which the government possessed by means of its audit and supervision over the accounts enable it to know with accuracy what were the real and essential working charges of the railways, and what rates might be considered as remunerative. The system of French railways, in fact, resembles that of the gas and water companies of the metropolis, each of which has its own district allotted to it, and is limited in the profits which it can make out of the gas and water which it supplies. Under the policy adopted by the Emperor capital was quickly provided for the construction of railways, and in the six years from 1851 to 1857 the mileage of the French railways was increased from 2,124 to 4,475, England at that time having 9,037 miles open. The effect of the railways soon began to tell upon the prosperity of the country—the imports and exports increased during this period from £102,000,000 to £213,000,000, or more than 100 per cent. The six great railway companies shared dividends averaging 10 per cent., and not a franc was paid out of the public funds to meet the guarantee on the capital expended. All the great towns and ports of France were rapidly being connected by railways, and its manufactures were making gigantic strides in their competition with England and other countries.

This extension of the railway system, however, only stimulated further progress. There were still wide districts between the great trunk lines which were unprovided with railways. The Emperor appointed a commission to inquire into the whole subject of railway communication, and the government engineers reported upon 5,000 miles of additional lines, which were declared to be of public utility and urgently required by the country districts. The construction of these railways involved the raising of a large amount of new capital. The Government of France could not undertake the work; the districts to be accommodated were too poor to provide the funds, and the great companies were too well satisfied with their 10 per cent. dividends to embark in further outlay. The plan adopted by the Emperor to meet this state of things was a masterly one, and it was successful. It may be thus summarized:

"You must make these lines, The 4,525 miles of railway already made shall be a separate system for the present, under the name of *Ancien Reseau*, the old lines. You no longer require the guarantee of the State for these lines. But I will give you an extension of the ninety-nine years of your concessions, by allowing them to commence at later dates; beginning with 1852 for the Northern Company, and at various dates for the rest up to 1862 for the Southern Company. I also engage that £9,000,000 sterling of the net revenue of these old lines shall forever be divisible among the shareholders, without being liable for any deficit of the extension lines, an amount which will give you a clear and indefeasible dividend of 6 to 8 per cent.; with a strong probability—almost a certainty—of getting much more from surplus traffic. Next the new lines, 5,128 miles in length, shall be a separate system, under the name of *Nouveau Reseau*, or extension lines. Their estimated cost is £124,000,000, and you, the companies, may raise this sum by debentures, on which the government will guarantee 4 per cent. interest, and 65 sinking fund for paying them off in fifty years. Any extra cost you must pay yourselves."

The companies with some reluctance accepted the proposal. The effect was to lower the value of the existing shares and reduce the rates of dividend, but the result of it was that new capital to the amount of £124,000,000 was raised by the issue of these debentures, and an enormous addition was made to the railway mileage of the country. Subsequently other extensions were made with similar guarantees and considerable subventions from the State. In 1863 a further mileage of 1,974 miles was proposed on similar terms, but with some slight modifications with two of the old companies. A further step was taken in 1865, when a law was passed authorizing departments and communities to undertake the construction of local railways at their own expense, and thirty-two departments of the country availed themselves to a greater or less extent of the provisions of the law to carry out their lines. The result of this was that by the close of 1865 the railway system authorized in France gave a mileage of 12,592 miles, of which 5,027 was of the old and 7,565 of the new *reseau*, bringing up the total to about the same as the constructed lines in England at that date. In the five years ending 1855 the railways of France increased from 1,807 to 3,315; in 1860 the miles open were 5,586, and in 1865 the number was 8,134.

In June, 1868, the Emperor proposed yet another extensive system of railways for France. At that time there were constructed 10,400 miles, at a total cost of about £280,000,000. There yet remained to construct of lines already sanctioned 3,200 miles, and the government then proposed to add to the system a further mileage of about 2,100 miles. In submitting this scheme the government said:

"Assuredly the gaps left in the government railway *reseau* of the Empire are not considerable. For many years already great arteries radiate from Paris to the extremity of the territory, and tranverse lines, now in working order or in process of construction, effect communications to great distances between various parts of the Empire. But if we carefully examine the map we shall soon find that several of these transverse lines are yet interrupted by important gaps, and that vast districts are entirely deprived of the benefit of railway communication."

It was with a view to the completion of these gaps that this third scheme of railways was designed and sanctioned. Whatever may be said of the faults, the follies, or the crimes of the Emperor Napoleon, to him at least belongs the merit of having provided France with a system of railways admirably adapted for the purpose of developing its vast resources. There are, doubtless, many persons who will still associate with the downfall of the Emperor the recollections of the past glories of the Empire—who will accord to him the credit of being a generous ally; a sovereign who raised France to a higher position among other nations than it had perhaps ever before enjoyed; who converted Paris into a city of palaces, and who, seeing the advantages, had the courage to introduce into his country the policy of free trade; but by those of our readers who look upon the iron roads as the great want of the age the Emperor Napoleon will be remembered as one who, by his bold and comprehensive measures, encouraged and aided, during the twenty years of his rule, the construction of nearly 15,000 miles of railway in France.—*London Railway News.*

Railroad Track.

The amount of money that is annually wasted on the 50,000 miles of railway track in the United States, because of the fact that the track is not properly kept up, would astound railway managers, if that amount could be definitely stated. This waste shows itself in a thousand and one different ways, in every element of the road-bed and superstructure and in every part of the rolling stock. It includes cross-ties, rails, wheels, axles, bolts, screws, connecting-rods, etc., etc., all worn out or broken before the term of their natural "life," merely because they are subjected to an infinite series of unnecessary strains, and concussions, consequent upon a rough and uneven track. The yearly repair expenses for rolling stock of different roads, if properly contrasted, would show the comparative effects on the rough and the smooth track; but in the multifarious ways adopted by different companies of keeping their accounts, the great and important facts are lost sight of at least they are kept out of the sight of the shareholder and inquirer into the details of management. A better system of keeping accounts, rigidly enforced by legislative regulation, might remedy this evil, but in the absence of this we are compelled to depend upon the well known mechanical laws governing the strength and wear of all materials entering into the construction of the track and the rolling stock. All these materials are perishable just in proportion as they are neglected or as they are abused. The rail that, if properly laid in line and plane, and protected at the joints, may last a dozen years, will not last a third of that time if the joints are permitted to settle a quarter or half an inch at every passage of the driving wheels, and the tire, that would run a hundred and fifty thousand miles over an even track, will not stand half

that service, if it is permitted to hammer itself to pieces at these joint depressions. Every railway man recognizes these general facts in theory, but in nine cases out of ten, they permit these violations of plain and well-known mechanical law, and so the annual repair expenses per mile run, of all rolling stock are largely in excess of what they would be if the managers would but give the necessary practical attention to the foundation of all true railway economy and that is: keep up the track to the maximum of stability and smoothness. Starting with a well drained road-bed with a good supply of ballast, with the cross-ties having plentiful and equal bearing per lineal running foot; and the rail with a good depth of section, so that the fish plates may give the requisite vertical stiffness and strength at the joints, and you have the best known type of a good and serviceable railway track. But *starting* with all these is not sufficient to secure good practical railway economy; they must be kept up. Every variation from it, whether due to climatic influences or mechanical influences, must be guarded against with the most untiring perseverance. Every cross-tie must be kept tamped up in place, and every fish-plate nut screwed to its proper bearing. This rattling, hammering, and jingling at the joints, which a certain Massachusetts railway manager used to call "the devil's own music," once stopped and kept stopped, prevents a good deal of the same destructive sort of music in the rolling stock. It is a great mistake to think that it is only the rail or the wheel that suffers from an uneven track. Three-quarters of all the breakages in the rolling stock are due to it, the general wear very much increased, and thereby the "life" or duration of service very much decreased. If any railway manager doubts this, let him ask his master mechanic if a large proportion of the machinery repair expenses are not due to the very evils we have pointed out; and when he has satisfied himself upon that point, he will be willing to expend more liberally upon the track, that he may preserve that and the rolling stock at the same time. Every expenditure upon the track, guided by intelligence and skill, is in favor of eventual economy, to say nothing of the greater safety it insures. One great trouble is, that managers underrate the character of the labor required in track repairs; they think it plain, rough work, that any common laborer can do, and so they graduate the pay upon that idea; when, in fact, there is no department of railway labor where skill and experience are of more value; not necessarily all the labor, but the directing and supervising part of it. An intelligent and skilful trackman is invaluable, and the possession of these qualities presupposes an amount of practical and *quasi*-professional education that deserves not only to be well recognized, but well paid for. On some of the larger and well managed roads, track repairs are entrusted only to men who have an engineering education, and their principal assistants and foremen on the different sections are selected for their intelligence and skill, and no disturbance of the track is permitted except under their eyes. The best results of railway operation will not be secured until a like system prevails everywhere.—*American Railway Times.*

Papers on Iron and Steel.

BY W. MATTIEU WILLIAMS.

A Very Costly and Vexatious Fallacy.

II.

The greatest enemy to steel is phosphorus; one-tenth per cent. is sufficient to produce serious deterioration, and even to render the harder varieties of steel utterly worthless. As our common English pig iron is made from clay iron stones, many of the nodules of which contain, as nuclei or otherwise, the remains of fishes and other animal matter, they are exceptionally rich in phosphorus; and thus all the difficulties of steel-making are greatly increased in this country. There are few results in connection with the progress of British industry of which we have better reason to be proud than our pre-eminence as steel-makers, in spite of the greatest natural disadvantages; and this is the more remarkable from the fact that so great a triumph has been gained by illiterate men who have achieved it by following out with a remarkably sound though unaided sagacity the strict method of true Baconian investigation. Whenever I meet a formulating book-stuffed pedant, I love to tell him of the great unconsidered fact, that while the learned men of the middle ages were muddling their intellects with worthless disputations, the artisans of that period were true inductive philosophers, and that the revival of science only commenced when the men of the universities adopted the method which had always been followed by the men of the workshop.

If the men of the universities have outstripped the men of the workshop in recent times, it is simply due to the fact that science has kept systematic record of its achievements, by means of which each worker has the full benefit of the labors of his predecessors and fellow-workers, and is able to start from the point where these left off; whereas the workshop observers and experimentalists have worked with little or no systematic co-operation. If such co-operation only among one set of investigators has done so much, what may we not expect when it shall not only be extended to the other, but when both sections shall co-operate with each other. This technical and scientific co-operation is the great want of the present age. The artisan needs scientific education, and the professors of science have much to learn from the great mass of facts included in the practical experience of the workshop.

But I must not at present be carried further away into this tempting digression, but return to my main subject by anticipating an objection which will probably be made. The manufacture of puddled steel may be supposed to refute all I have said regarding the impracticability of producing steel directly from English pig iron. If steel fit for the manufacture of files, chisels, etc., could be made from ordinary English pig iron by this process, all my statements certainly would be refuted, for puddled steel is simply made by checking the oxidation and arresting it at such a point that some of the carbon in the pig iron shall remain unburnt.

The facts connected with the manufacture of puddled steel which bear upon the present subject, are as follows: First, puddled steel of merchantable quality cannot be made at all from *common* English pig iron. Second, the manufacture of puddled steel has been much more successful on the Continent than in England. Third, only *mild* steel, and that of an inferior quality, is made by this process from English iron.

Referring to the first fact, I may mention there is a great deal of mystery, and there have been a great many failures and much waste of labor, fuel and iron in carrying out this process in England. In many forges where it has been tried it is now altogether abandoned, and where it is carried on with any degree of success there is usually much secrecy maintained. Now the mystery is not in the puddling, as the necessary modifications in the supply of cinder and the working of the damper are well understood, and have been sufficiently explained in the specifications of abandoned patents and otherwise. The secret part of this process is in the selection of the pig-iron, or rather of the "blend" of the pig-irons, for it is found that a mixture of certain brands of pig-iron is better than any single brand used alone.

My own experience in connection with this subject has been very interesting, and is, I think, worthy of record. When engaged as chemist in the works of Sir John Brown & Co., of Sheffield, I made careful analyses of all the numerous brands of pig-iron that are used for various purposes in these works. These I tabulated and kept continually before me, in order to compare their composition with the special uses to which they are applied, and the properties which they, or the material made from them, exhibited. The manager of the iron department was a remarkable example of one of those self-taught, unconscious philosophers I have above alluded to. He has, during many years, been observing, experimenting and generalising his inductions consisting of a code of original rules for the manufacture of iron suitable for various purposes. Like the man who had talked prose all his life without knowing it, he has been following strictly the injunctions of "Novum Organon" in discovering the best "blends" of pig-iron for manufacturing respectively armour-plates, rails, boiler-plates, angle irons, &c., &c.; and among his other mysteries were certain blends for making puddled steel. These he calls his "steel irons." He selected these, like all the others, without having, or pretending to have, any knowledge of their chemical composition.

By quite a different path, *i. e.* upon purely theoretical chemical grounds, I had determined that certain brands among those I had analyzed were the best fitted for making puddled steel, and was anxious to verify my theory. To have asked directly for a revelation of the iron manager's secrets would have been unreasonable, and therefore I simply gave him a statement of the analyses of these particular brands all arranged together, and called them "steel-irons," adding that for the best work I supposed he mixed with them a proportion of a certain foreign brand. "Hush, don't talk so loud; I don't want these fellows to hear you. Who told you that I use these?" was the substance of Mr. Jevon's reply. My theoretical and his practical selections proved to be exactly the same in result. He had selected just those particular pigs which contained the smallest percentage of phosphorus, and which relatively to their carbon contained the smallest proportion of silicon.

But this was not all. I had just concluded a number of experiments made for the express purpose of determining the function of manganese in the manufacture of iron and steel, and had come to the conclusion that its usefulness depends upon its readily oxidising, even before all the carbon is oxodised, and thereby affording a base with which the silica could unite and form a liquid and readily fusible silicate. Now this is just what is wanted in making puddled steel, and hence I suggested the addition of the highly manganiferous foreign ore. He had recently discovered that it did just what I expected, and supposed that his discovery was quite new. Such, however, was not the case, for this, like so many other trade mysteries, had been independently discovered by a number of other practical investigators.

The foreign manganiferous metal referred to is Spiegeleisen. Dr. Percy says "Spiegeleisen has been found admirably suited for the production of puddled steel of the best quality, and accordingly it is largely used for this purpose." Now spiegeleisen is remarkably free from those impurities which, as I have stated, cannot be removed from common English pig-iron without also taking out the carbon. I find that the average proportion of silicon to carbon in English pigs is about three-fourths; in spiegeleisen it is below one-fourth, and that the average proportion of phosphorus in the samples of spiegeleisen which I have analysed, it is less than one-twentieth of the quantity contained in our Cleveland pigs. Three, four, and five-hundredths per cent. is the quantity I ordinarily find in good German or Swedish spiegeleisen. The sulphur seldom exceeds one-tenth per cent., and the large quantity of manganese materially assists in the removal of the silicon. It is, in fact, very similar to the Styrian cast-iron, which, as I have already said, does not present the English difficulty of making steel by the direct process. Both are charcoal-irons, made from remarkably rich and pure ores. The manufacture of cast-iron from such ores, and steel from such cast-iron is mere child's play compared with our native manufacture.

In reference to the second fact that the manufacture of puddled steel has been carried out more successfully on the Continent than in England, I need only say that this confirms my statements, as the puddlers there are less skilful than ours, and their raw material is a vastly superior charcoal-iron, such as I have already described.

The third fact, viz: that only *mild* steel of inferior quality is made by this process, is further confirmation of what I have said respecting the necessity of removing the carbon from common pig-iron in order to purify it sufficiently to produce good steel; for even with all this skilful selection of the purest pigs, and the mixing of spiegeleisen with them, it is found in this country impracticable to make puddled steel containing more than one-half per cent. of carbon. Such steel is only fit for rails, tires, for rubbish cutlery, and other purposes where a very soft steel, or rather steely iron is used. If the puddling were stopped when the carbon was only reduced to about 1.75, or say 1.5 per cent. (the quantity contained in the best hard cast-steel), the puddled steel would be utterly rotten, it would crush under the hammer whether hot or cold; the reason of this being that even with the best English pigs, the selected "steel-irons," there would, with this amount of carbon, still retain a ruinous proportion of silicon, phosphorus, &c. It is necessary with all available advantages to bring down the carbon to within one-half per cent. in order to produce a workable material. Even then it is worth only about one-third of the price of good cast-steel.

I might illustrate this subject still further by entering into the details of the chemistry of the Bessemer process and of Bessemer steel, by the history of the nitrate of soda process, and of other attempts to manufacture steel directly from cast-iron; but I think the above is sufficient to expose the fundamental fallacy upon which all such attempts have been founded. I hope to have succeeded more particularly in demonstrating the very great error of those who, in their attempts to make such steel, have, like the friend of my correspondent whose letter opens this paper, deliberately chosen cinder-pig or other inferior iron upon which to make their demonstrative experiments. This was the case with the Heaton Company. They worked for a long time at Langley Mill with one of the worst classes of pig-iron they could have selected for their purpose. I pointed this out to them in a letter printed in the *Chemical News* of February 19, 1869. This effort, the most promising of any of the kind, on account of the action of the residual alkaline soda, was, through this serious mistake, never fairly tested. I witnessed some of their experiments, and analyzed and otherwise tested the results. There can be little doubt that with properly selected pigs a material similar to puddled or Bessemer steel may be made by this process, and by several others that have been tried and have failed; but with the common classes of English pig-irons, all such attempts to make steel by the partial oxid tion of the carbon must of necessity fail, unless some entirely new, some hitherto utterly unknown method of removing the silicon, phosphorus, and sulphur of the pig-iron is also used In such a case the novelty, the invention, the triumph, would consist not in the decarburisation of the cast-iron, but in the separation of other ingredients.

I therefore recommend all inventors who seek to simplify or otherwise improve the manufacture of steel, to direct their attention first to the removal of phosphorus, next to the removal of silicon, thirdly to the removal of sulphur and last and least of all to mere decarburisation, for that is a problem of the utmost simplicity, and already sufficiently understood.

My next paper will be "On the Chemistry of the Bessemer Process," and will include some original observations, the results of which I believe to be of considerable value to the numerous manufacturers who are now erecting or working Bessemer plant.

Mechanical Draughtsmen.

Perhaps of all the vocations pursued by mankind to win its bread or maintain what is termed a position, the most ill-defined in its limits or in the nature of its duties is that which is called by courtesy the profession of engineering. Of the military origin, the earlier days of the calling were devoted to the cultivation of science in all that applied to sundry modes of attack or defence. And the man who could set out the lines of the strongest fortress, or devise the most effectual method of discomfiting the enemy, was the one whoo stood highest in his profession as an engineer. Great as was his renown as a man of science in other ways, Archimedes owed not a little of his fame to the skill he displayed in baffling and defeating the enemy at the siege of Syracuse. As time progressed we find engineering still almost solely a military profession, with Vauban, Cohorn, and men of like character at its head, but these did not write the C. E. after their names, a practice so general in the present a practice so general in the present day. Indeed, these letters were first used to show the line of demarcation between the man of war and the man of peace. Engineering, apart from mere road-making or surveying, made little mark in society till the railway era. Stephenson, however remarkable his talents, yet could not, and did not, consider himself a gentleman in the conventional sense of the term. He, however, succeeded in demonstrating the possibility of transporting passengers or goods at thrice the speed of the fastest mail coach. Most persons not yet fifty years of age can remember the events that succeeded the Rainhill trials. One company after another started into existence, and Parliament was besieged with petitions for bills to enable lines of railway to be constructed. However successful Stephenson might be with the horse, the road also demanded some special consideration, and before a bill could be petitioned for the applicants should show plans and sections of the lines they proposed. Men were required for this work—a new and profitable field of industry was thrown open. Men who could scarce tell one end of a level from the other were paid enormous salaries to help in the requisite surveys and to assist in plotting them for the inspection of Parliament. Parents who had been at a loss whether to put this son into the church, or that in a lawyer's office, now found that there was fresh fields and pastures new in which their sons might at once earn nice incomes and become members of what promised to be a fashionable profession. As most boys evince a predilection for wheels and mechanical toys, there was little difficulty in a parent persuading himself that his son had a special fitness for this new calling. From these causes the engineer army was very quickly recruited to full war footing and a little over. Organization followed

as a matter of course; and while some young men were engaged at field work, others were kept at the drawing board, plotting and tracing. These latter soon came to be designated draughtsmen.

With railways came the natural stimulus to all trades, and manufactories for the construction of machinery became numerous. In these, again, as machinery improved, more drawings were needed, and young men were bound apprentice and put into the drawing office. So far all well, but reaction set in and the railway engineer's vocation was much reduced, and unfortunately still remains so. Bad habits remained, however, and as the construction of railways was the first nursery of civil engineering, most followers of the profession considered that the knowledge of how to make a railway was the beginning and end of it. The sad result is familiar to all. When time of commercial panic arrived there was an end to railway construction for the time, and any railway men not possessing grasp of mind—men, in fact, pitchforked into the profession by their friends, and who lacked any real talent for it—found, and we fear still continue to find, themselves and their families almost wanting bread. These men, who most likely began as draughtsmen and were then pushed by interest and helped by dry nurses, got along while work was plentiful, but now that depression prevails in their special departments they are reduced either to sore straits or to seek some other business, frequently one widely removed from engineering.

Although railways are not to be made so rapidly now, those already constructed are making work in other ways for engineers. The profession is essentially an expansive one, and there is ever a demand for improved machinery. Many persons now, however, say "Why should we make our sons engineers? There is but little of what is *par excellence* civil engineering work, and as to mechanical our sons may be for years but draughtsmen at twenty or twenty-five shillings a week." There is much apparent truth in this, but a good deal also of sophistry. A good man will always command good pay. Engineering has, after a species of hot-house forcing, gradually subsided into the same jog-trot routine as law or physic; it, like these, demands years of patient labor before success is attained, and it behooves parents to consider well the fitness of their sons to enter on what is now as hard working a profession as any to be found. The mechanical branches are those which contain most promise of success. The prizes may be on the whole, perhaps, small—smaller individually—but they are also more numerous than in civil engineering or that which deals with roads, bridges, and the like.

Parents object not unnaturally to let their sons do what is technically known as "passing through the shops;" they demur to the necessity that their sons should wear the same dress, keep the same hours, and be in all points on an equal footing with the commonest or worst-behaved rivet boy in the works. They are, if wealthy, willing to pay a heavy premium to a large firm such as Penn & Sons, or Beyer & Peacock, and make their son a gentleman apprentice. If poor, they try to place the lad in the drawing office where too often he is kept at work tracing or lettering drawings, but seldom getting any practical designing to execute, rarely allowed into the works, and at the termination of his three years is worth what he gets—twenty shillings a week. It is a common thing for persons to say just now that excellent draughtsmen can be had, even in London, for this sum. We question it. Possibly two years ago, when the profession was well nigh dead, they could be had, but scarcely now. Without doubt men who can make a nice tracing or copy can be found, but where is one to be had who can design any machine or part of one? Where is it possible to get a man who only needs to be told the object the chief draughtsman desires a particular detail to accomplish, and who will be capable of drawing out a design that will be at once practically correct, as admitting of being made cheaply—perhaps even made at all—and that will fulfil its duties in the best manner? To work out such a design, the draughtsman must be more than a mere drawing machine, he must have natural judgment educated by practical experience in the shops. What can a man who has never done anything during his apprenticeship but copy or trace drawings—what, we repeat, can he know of the necessity of considering whether a screw stud or bolt be most advisable to fit in a certain place? How can he appreciate, or even properly forsee, the necessity of disposing nuts in such places as that the spanner can be applied to turn them. Such common practical points are essential in the education of any young man who means to rise in his profession. How can a mere copyist, a mere paper engineer, ever hope to get beyond a paltry £60 or £80 a year? Therefore the parent who proposes to make his son an engineer must weigh well the evils on the one hand of throwing his child amongst a very mixed society, with the know edge that in so doing he exposes him to evil example sometimes, but also knowing, on the other hand, that he is securing him the most thorough and sound foundation for his professional education. This question parents alone must decide for themselves.—*Mechanics' Magazine.*

English Railroad Dividends.

Shareholders in English railways have lately been receiving better dividends than in some previous years, and consequently they are in excellent spirits. They are quite aware, too, that the evidence of improvement in their property is supplied by other facts than the mere dividends. The half-yearly reports lately issued, and the explanations furnished at the meetings, show that the larger profits earned have been derived from a variety of causes, which may, with ordinary care, be deemed permanent. Both managers and directors have undoubtedly profited so much by past experiences that favorable influence will be put to use with a practical judgment unknown some little time back. One cause of the increased dividend is a rapid natural growth of revenue; another is a steadily enforced reduction of expenditure. About the revenue of English railways—of the leading lines, at least—there was never much room to feel anxious. The directors had only to work with a reasonable appreciation of public wants, and the traffic would grow of itself. Unfortunately, the mad jealousy of other companies led to rival schemes of extension, and costly branches, which, involving heavy outlay and adding large sums to capital, thus more and more fixed a charge upon the income of the future. It took time and a few bitter lessons to cure boards and shareholders of that bad habit; but experience told at last, and the worst days of the extension mania are now over. The natural growth of revenue, therefore, now accrues to a railway without the old drawback which neutralised all the benefit. Of the expenditure we may say, that, whereas it was formerly the pride and delight of ambitious companies to show how they could burn the candle at both ends, and in the middle as well, they have now fallen back on the original practice of lighting it at one end alone, and preventing it from guttering even at that end. There is no waste now; optional expenditure is conspicuous by its absence, and what is needful is scrutinized with a keenness of vision for the main chance that promises a considerable difference on the credit side of profit and loss account when the balance is struck. Parliamentary expenses, a heavy item in the old days of mutual jealousy, are now reduced to a minimum; and disputed points, instead of being taken to the law courts, and settled by friendly conference. Floating debt is largely converted into permanent debt; and that operation has so aided in improving the credit of the companies affected, that they can carry out economy on a scale formerly impracticable. The result of all these influences combined is, that every leading English line has just paid to its original shareholders a better dividend than at the corresponding period of last year, the increase ranging from a quarter to one and a-half per cent.; while others that might have done so have simply refrained because they prefer adding to their reserve. There is no doubt about the reality of these gains; the stringent form of accounts now required precludes obscurity or deception. With such fruits of an improved policy, it may be assumed the shareholders will have the good sense to persevere as they have just begun; and if they do, the advantages will be felt more and more keenly with every year that passes.—*London Telegraph.*

The Mobile & Ohio Railroad Shops.

We copy the following description of the Shops of the Mobile & Ohio Railroad which are located at Whistler, six miles north of Mobile, from a longer article in a recent number of the Mobile *Register*. About 400 men are employed in these shops:

The shops are large, and are arranged in a most admirable manner for convenient and expeditious work. As instance, the main machine shop, which is so arranged that the locomotives are run into stalls, some dozen in number, along one side or half of the building, while the other side and right adjoining the stalls are the various power tools, aggregating perhaps fifty in number, and comprising planers, drilling machines, punching machinery and lathes of every description, including one recently put in of great size, and which takes a pair of driving wheels of a locomotive in without their being removed from the axle, and turns them both off at the same moment by almost automatic machinery, requiring the attention of only one man, and executing the job in an incredibly short time.

Parallel to and adjoining this shop, is the blacksmith shop, with its immense forges and steam hammer, which perhaps is more perfect and larger than any other in use in this country. It was made under the direction of Gen. McCallum, Superintendent of Military Railroads for the United States Government, without any regard to expense, but simply to perfection of work. The war closing just as it was completed, it was offered for sale with the other vast quantities of railroad machinery accumulated by the government, and was purchased at a very low price by Major Fleming for his shops. It is a remarkable hammer, so ponderous as to crush to a wafer a heavy bar of iron, yet so nicely adjusted that the man who manages it says he can crack the crystal of a watch under its face without injury to the mechanism. Next to this shop is the foundry and boiler shop; all these side by ride, and ranged along the stalls or tracks for receiving the locomotives, bringing the work and the means for performing it into close connection and vastly cheapening the cost.

Beyond the machine shop is the extensive wood-working and car-building shop, where huge rough timbers and boards are taken in, cut, planed, mortised and framed, all by machinery, and two complete first-class freight cars turned out per day. And, speaking of these cars, of which in all 200 are now being built uniform in style and size, they are truly models, and will not only reflect credit upon the road and its management, but will secure to their designer, Major Fleming, new honors among railroad men. In their construction he is introducing

TWO MOST VALUABLE IMPROVEMENTS,

of his own device, and which have stood the severest tests on his road, and produced most satisfactory results. His improvement in car-trucks and breaking device consists in placing the springs which sustain the car upon two equalizer bars instead of one, which are lowered so as to bring the body of the car about a foot lower than the common style of truck—a great desideratum—and in placing the break between the wheels instead of outside; the break bar or beam is made long enough so that, should the fastenings or hangers give way, the bar would catch upon the equalizer bars, and thus be prevented from throwing the car off the track, as would otherwise follow. The body of the car rests on the truck, through the medium of a swinging or moveable beam, permitting a lateral motion of the car body. The strength and security from accident attained in this truck will readily appear to every railroad man. The advantage of bringing the car-bed a foot lower can be understood by all. We regard this a very valuable invention, and have no doubt it will go into general use. Major Fleming is also introducing a decided improvement in the coupling, draw-bar and buffer of freight cars. Greater strength of coupling and equalization of the concussion from the cars running together from sudden breaking or from accident are secured by this improvement. The Winslow patent iron roof is being used on all the cars, and an iron-cased window, with an iron-grate shutter, as well as a close shutter, is placed in each car. The cars have a peculiar device, a sort of irregular quadrilateral, painted in bright yellow on the side, the lettering on which indicates that they belong to the great through fast freight line to St. Louis, over the Iron Mountain Road.

These cars will be a feature of the road, and will afford ample facilities for quick shipments through to St. Louis or hence to this place.

In the car shop we found the body of

A MAGNIFICENT PASSENGER COACH,

fifty five feet in length, full height and width, and nearly completed. This is the first of a lot of passenger coaches which the road will immediately construct, and which fully equal, in all respects, and in strength, perhaps, excel the finest coaches of Northern make. They are being finished beautifully inside with native woods, of which several varieties have been found that finish up equal to the finest maple, chestnut, ash or walnut, of the North. One species of wood has been used in finishing one car, the name of which no one there has been able to give. Major F. says the old tree had attracted his notice for thirteen years past, standing beside the track, and finally discovering that it was of fine quality of timber, and unlike anything of the kind he ever saw, he determined that it should be felled and cut into boards. It finishes most beautifully—is very hard and close grained, but no one can give its species.

Major Fleming is introducing in these cars a well-appointed ladies' dressing saloon, or washroom, similar to those in the modern sleeping cars, which will be exceedingly comfortable on so long a road, especially in this climate. These cars will all have the six-wheel trucks constructed with the improvement noted above.

The evidence afforded us by the work going on in the shops at Whistler, that the company intend speedily to make their road first-class in all its appointments and rolling stock, will be gratifying to the public. Immense quantities of material for cars is gotten out, and in a little while the road will be supplied with a full number of both passenger and freight cars of the best construction and finish. What will surprise the public here, who are in the habit of looking to the North for every manufactured article, will be to know that at Whistler, in the company's own shops, is manufactured every article of use on the road—down to the stoves and water coolers of the cars—except new locomotives, car wheels and axles. And the work turned out in every department is in no way inferior to that of Northern shops. Even locomotives can be constructed at Whistler entire, and a *reconstruction* of the old wrecks which travelers have noticed ranged along the side track at Whistler, the debris of war, is now going on; and we were surprised when told that a beautiful locomotive we saw about ready to come out, was one of those wrecks rejuvenated.

A CURIOUS MACHINE,

sort of hybrid, is now being built and is nearly ready for use, which is a design of Major Fleming's, and is intended for pile driving, of which there is a great deal to do on the Mobile & Ohio road. The machine combines locomotive power with the pile driving. It is a large platform car, of great strength, with a pair of driving wheels in front. On the car is a locomotive boiler, a double engine, water tank and wood box. The engine is coupled with the driving wheels by gearing, which can be thrown out and the power applied to raise the hammer for driving the piles. The upright beam or mast is hinged, so that when the machine is moving, it is lowered to avoid bridges. The frame work is on a pivot, admitting the hammer to be used in a large arc. An ingenious arrangement of two small trucks enables the whole machine to be moved laterally on rails temporarily laid for the purpose, so as to clear the main track for a passing train. Heretofore pile-drivers have required a locomotive to attend them and the expense of their use was much heightened thereby. This combines the power of propulsion in itself, and is really, while an unsightly, yet a curious machine. Major Fleming during the last year, since getting his roadway tolerably well reconstructed after the war damages, has been devoting himself largely to the mechanical department of the road, and the several improvements named are the direct and important results. He has also perfected an improvement in the ordinary elliptic steel spring, which promises highly. It is the use of a sort of divided and reversed spring within the elliptic of the ordinary spring and supporting by a movable shoe-like attachment the outer spring at its weakest point, or point of greatest strain. The shops at Whistler are under the immediate personal charge of Mr. B. S. Skates, the Master Machinist of the road, and are certainly becoming model shops. Mr. Skates has recently invented a machine for straightening car axles, which works to a charm, and cheapens the process ten fold. The axles are straightened without removing the wheels, at the average cost of less than *fifty cents* each. We spent several hours in the shops, and saw much of interest which which we have not space to narrate. The place is worthy of a visit by any one who takes an interest in the operations of mechanical industries. The company has recently erected some extensive car sheds, and are now in need of a new and substantial "round house," the present one being a wooden structure and very old. With the present spirit of improvement which seems to be upon the management, we may look for the early putting of this road, in all its appointments, on a par with the best in the country. The company had an immense task to perform in getting up from the ruin of the war, but the road is through a wonderful country and its resources vast, which have but to be liberally and energetically managed to develop the road, not ouly to a great business success, but to one of the chiefest public institutions of the nation.

The Russian Railway System

The introduction of railways into Russia is due to a Court favorite, Count Bobrinski, who in 1836 succeeded, as a special mark of grace, in obtaining permission from the Emperor Nicholas to form a company for laying down a line eighteen miles in length, from St. Petersburg to the Imperial residence of Tsarskoe-Selo. It was a whim; but Bobrinski was a charming man, and the Emperor saw no harm in letting him have his own way in so trifling a matter. Oddly enough, this fanciful speculation paid, which was so much the better for the shareholders, but had no effect in inducing his Majesty to sanction the formation of new railways until six years afterwards, when, in 1842, he ordered the construction, at Government expense, of the magnificent iron road which binds St. Petersburg to Moscow, the modern to the mediæval capital, which, thanks to railways, is fast becoming the modern capital again. The Emperor Nicholas was too fond of rapid traveling to object, in the ab stract, to express trains; but he had a low opinion of Western Europe, and thought the less Holy Russia had to do with that depraved portion of the world the better. Hence his deep moral aversion to railways, which, sooner or later, could not fail to bring Russia into close contact with the society and ideas of the revolutionary and irreligious West. The railway system of Russia is at this moment separated from the railway system of Germany, and also, significantly enough, of Poland, by its wider gauge; and during the reign of the Emperor Nicholas no thought seems to have been entertained of connecting St. Petersburg by rail even with Warsaw. But it was obviously an advantage to be able to perform the journey between St. Petersburg and Moscow in 20 instead of 80 or 100 hours; and since quickness was the great object, the line was made as nearly as possible, in conformity with the definition of the geometrical straight line "lying evenly between its extreme points." It looks on the map as though it had been traced with a ruler, and it is believed that the Emperor Nicholas so traced it with his own hand. The first section of the Moscow-St. Peterburg Railway was finished in 1847, but it was not until 1851 that the whole line was completed and thrown open to the public. During the three following years not a mile of railway was constructed in Russia, and when the Crimean war broke out the conveyance of troops, and stores from the centre to the south was attended by hardships the severity of which does not seem to Mr. Rumbold to have been adequately appreciated. He draws an ingenious but certainly a forced comparison between the successful defence of Russia in 1812 against the French, and her unsuccessful defence in 1854 and 1855 against the French and English, and argues that the retreat of the French from Moscow was attended by scarcely greater difficulties than those which attended the advance of the Russians to the relief of Sebastopol at least, however, the Russians, marching to the relief of Sebastopol, had no enemy in their rear, nor did they march without supplies, nor did they always march from great distances, nor was there anything new in Russian armies marching to the Crimea. At the same time it may be admitted that some of the causes which contributed to the success of the Russian arms in 1812 had a contrary effect in 1854 and 1855, and it would, in any case, have been very convenient for the Russians to have been able to send troops from Moscow to the Black Sea by rail.

The Russians themselves were deeply impressed, through the events of the war, by the imperfect character of their communications, and one of the first things that occupied the attention of the Russian Government after the Peace of Paris was the necessity of constructing railways. Until 1859 there was no railway communication between any part of the Russian dominions and the West of Europe; that in that year the lines which connect Warsaw with points on the Austrian and Prussian frontiers were opened. In 1862 was completed the great line of railway which connects Warsaw with Wilna and St. Petersburg, and which enabled the Russian Government to pour troops in irresistible numbers into Poland. During the last four years the railway system of Bussia has been extended in a southerly direction. Eight hundred miles of rail had been opened in the year 1862. Upwards of 2,400 miles were opened between 1866 and 1869; and at present the traveler may proceed by rail from St. Petersburg to Moscow, from Moscow to Kursk, from Kursk to Kieff, from Kieff to Balto, and from Balto to Odessa, a distance of 1,452 miles.

One effect of the construction of this vast system of railways, which is constantly receiving fresh development, must be to reconstitute Moscow the capital, as it is at this moment the chief town of the Russian Empire, and to give great additional importance to Kieff, the chief town, and, in a commercial and social sense, the capital of Southern Russia. Every iron road in Russia will lead to what Madame de Stael called the "Tartar Rome" while St. Petersburg runs the chance of being cut off from the general commercial system of the country, except as a mere dependent upon Moscow. St. Petersburg has been called "the window through which Russia looks out upon Europe;" but it is to the more happily situated Riga as an attic casement to a glass door, and when the line from Moscow to Smolensk is completed it will be as easy, and not much farther to travel, from Riga to Moscow than from St. Petersburg to Moscow. Indeed, when all the railways now in construction are finished, Moscow will be the central terminus of six great lines, comunicating—1, with Riga and Libeau; 2, with St. Petersburg and Helsingfors; 3, with Yaroslayl and Perm; 4, with Nijni-Novgorod, Kazan, Ekaterinburg and Tiumen; 5, with Orenburg, with Saratof, with Astrakhan, and with Novo-Tcherkask; 6, with Tagniog, Sebastopol and Odessa. Kieff, on its part, will derive great importance as a centre of railway communication from its immediate connection with the South Russian, Turkish and Austrian lines, and with the principal lines in Russian Poland, a position which ought certainly to make it the second commercial city in the Empire. In the section of his report devoted to a consideration of the "financial position of Russian railways," Mr. Rumbold gives an edifying account of the conditions under which the first great line, St. Petersburg to Moscow, was constructed and worked. This line, which is without tunnels or embankments, and passes over a perfectly flat country, cost altogether twenty millions sterling, and for many years, so long, in fact, as it remained in the hands of the State, gave most inadequate returns. Officers in uniform traveled habitually for nothing, and enterprising civilians would pay third-class fare, or no fare at all, and bribe the guard to be allowed to travel first class. The only persons who made their fortunes out of the Moscow-St. Petersburg Railway were the guards, the engineers, and, above all, the contractors. Indeep, the contract for keeping up the rolling stock on this line is one of the curiosities of commerce, and is celebrated as such throughout Russia. The late Prince Menschikoff, meeting a foreign traveler who wished to see the most remarkable things in St. Petersburg, is said to have advised him to to begin by having a look at Messrs. Winans's contract. Its provisions are so numerous and so lengthy that they form a good-sized volume; "but they may be briefly described," says Mr. Rumbold, "as binding the contractor to provide and keep up the rolling stock required for the line at prices and on conditions that have hitherto proved well-nigh ruinous to the undertaking." A French firm—Messrs. Cail & Co.—who undertook the working of the railway after Messrs. Winans, found the whole of the rolling stock brilliantly painted, but had no clue to the age of the various carriages, &c. A series of break-downs ensued, followed by the retreat of the French and the recall of the American contractors, who, intimately acquainted with the varying quality of the material they had to work with, experienced no difficulty in once more carrying on the business of the line. The complimentary reason given by the Minister of Public Works for having recourse in the difficulty to the original contractors was "that they alone were able to work rolling stock of such inferior quaitty as that which they had provided." From some details given by Mr. Rumbold in respect to the notorious contract (which terminated, we believe, last year), it appears that the cost of keeping up the rolling stock on the Nijni line is 29 copecks per werst, while on the St. Petersburg line it amounted (under the contract) to 72 copecks per werst—a notable difference. About £100,000,000 sterling has been or will have been spent on the 7,500 miles of railway either built or building in Russia, an enormous sum considering the little value of land in Russia and the almost total absence of engineering difficulties. And if much has been made out of Russian railways, much, it is to be feared, will be lost by them before long. It is the fashion, or rather it is a mania, just now in Russia to invest money in railway enterprises; and the holders of concessions are profiting by this mania with an ingenuity which the skilled promoters of Western Europe might envy. Mr. Rumbold admits that there is method in the speculative madness which has seized all Russia, but the madness exists, and must lead to disastrous consequences. The completed railways, however, have already greatly enriched the country, and by opening new markets to the landowners, and rendering the old ones more accessible, have saved numbers of that class from the ruin with which they were threatened through the effects of the Emancipation Act. They have had another result which will be attended with moral consequences. They have helped to destroy absenteeism on the part of the great Russian proprietors. Before the existence of railways many a proprietor, with land in the distant east or south of Russia, went from St. Petersburg to Paris or Baden without ever visiting his estate, which might well be more difficult of access. "Now," says Mr. Rumbold, in one of the concluding passages of his thoroughly interesting report, "both necessity and an increasing sense of the responsibility of ownership send the Russian down to his estates every year as regularly and nearly as willingly as members of either House to theirs at the end of a session of Parliament."

The Dead-Head System.

The dead-head system is carried to a most absurd extent in almost all departments of business in this country. The apparently almost universal desire of mankind to get something for nothing has been here gratified to a most unreasonable degree. Especially has this been the case with telegraphs and railroads, of which the managers are seldom the principal owners, and their desire to secure popularity for themselves and for the enterprises with which they are connected has led to a sacrifice of the true interests of stockholders, and the injury of the property committed to their charge. The general disregard in this country of small economies and the contempt for small sums, which in the aggregate, make large amounts, make it not only unfashionable, but almost disreputable to urge the rights of stockholders and employes in this matter.

The public generally have no idea of the amount of dead-head or free business constantly passing over telegraph lines. Much of the nominally free business is, of course, merely an exchange as between telegraph, railroad, and express companies; but, aside from this, an altogether unreasonable amount of such business is constantly occupying the time of telegraph employes and the wires, for which in fact no compensation is received. And we contend that the principle of exchanging courtesies and the use of facilities between telegraph, and railroad, and express companies and employes is wrong, and the sooner it is abolished the better for all parties. In cases where such exchange is necessary or desirable, an account should be kept on both sides and at stated periods settlements should be made, and the balance, if any, should be paid by the party in excess. There is really no more reason why a telegrapher should travel free, or railroad employe have free use of the telegraph, than that they should have free boots or free board. The public sentiment on this point is demoralized, and needs education and reform.

But, besides this, there is the other class of dead-head business for which there is in reality no compensation, but only an expectation that in some way the compliment will be returned. Added to this, is the distribution of passes to government officers, members of Congress, and of legislative, and sometimes even of municipal bodies, which are intended and expected to influence their official action. Nothing can be said in valid defence of either of these classes of business. The latter must be regarded as intentionally corrupt and demoralizing, and any such officer who accepts and uses a pass *knows* that it is intended as a bribe to influence his official action.

It is high time that this demoralizing dead-head system was done away with. Its effect upon the telegraph interests are evil and only evil. Persons who have the free use of the telegraph naturally avail themselves of it to a much greater extent than if the privilege was paid for at the usual rates. The consequence is, that the wires are constantly flooded with this class of business, often to the delay of paid dispatches and the serious reduction of the revenue of the companies. Take away this privilege and where three such messages are sent now not more than one paid dispatch will be forwarded; thus relieving the wires, overcrowded during business hours, materially, and affording opportunity to transmit paid business instead. In this way the revenues of the companies will be doubly benefited and a much more favorable balance sheet shown. In reality, no good argument in favor of this absurd dead-heading can be adduced, and we believe that, as a general thing, telegraph managers would themselves gladly terminate it, but that they fear to adopt and sternly carry out what they know must be an unpopular reform.

As we said before, the public have no idea of the amount of this dead-head business constantly passing over telegraph lines. No company publishes this item in its reports. If known at all, the knowledge is confined to the auditors department and to the higher officers of the company. The first year of consolidation of the present Western Union Company its dead-head business amounted to over half a million of dollars, and it has been constantly increasing since, until now it must for that one company alone, amount to more than three quarters of a million of dollars per year! This amounts to a dividend of two per cent. on its capital of forty millions of dollars! As that company has paid but two per cent. dividend during the past year, it follows that at least half of its profits have been wasted in carrying dead-head messages. This is a gross injustice, not only to the stockholders, but to the employes and paying customers of that company, and one which should at once be remedied.

The competing companies can show no better record in this respect; and, in fact, some of them are even worse than the Western Union. There are no statistics available to illustrate and demonstrate our assertions, but every experienced telegrapher knows that they are correct. We commend these facts to the earnest consideration of all telegraph managers. Here is a most important reform which it is practicable to enforce at once. The evil is increasing and should be at once and effectually reformed. Stockholders and other interested parties, in seeking for the reasons why their investments don't pay, and can't be made to pay, will find a not unimportant one in the amount of free business which occupies their wires. Employes may find in this one of the causes which necessitates low salaries, and should aid instead of opposing and thwarting, as they too frequently do, the partial attempts which are made to correct the evil.

The true principle in administering telegraph lines is, that no despatches, not strictly connected with the business of the line, should be transmitted unless paid for. When this rule is adopted and *enforced*, a marked improvement will be shown in the financial statements of all American telegraph companies.—*The Telegrapher.*

—One of the correspondents of the *Times* tells of a successful dash made by cavalry on a French railroad train. He says: "One feat of the Prussian horse was told me to-day, which is worth recording. A patrol came to a station on the road to Rheims, and saw a train just leaving. There was an engine steaming away, and about to start after it. An officer and a couple of troopers dismounted, and, quick as thought, dashed at the platform, stopped the driver with pistols, trigger fingered, mounted on it, and made him drive full speed to the train, which they overtook, followed by the mounted men, stopped it, and captured a mail full of letters and papers with important information. That was quick and smart, anyhow."

—A correspondent of *The Telegrapher*, writing from San Francisco, gives the following specimens of messages received for transmission at California offices:

"The following is a copy of a message, as received for transmission, from a German customer:

'Hows not weethsvasht lief Furniture at Landing. Laether to knith.'

TRANSLATION.

'House not whitewashed. Leave furniture at landing. Letter to-night.'

"Here is one even less intelligible:

'Teund sent does gutes berticlers per express.'

TRANSLATION.

'Don't send those goods. Particulars per express.'

"With one more specimen, I will conclude for the present:

'Laht mi noh how motsh he tukh Cipp Cwiht.'

TRANSLATION.

'Let me know how much ee took. Keep quiet.'"

General Railroad News.

OLD AND NEW ROADS.

Sherbrooke & Kennebec.

This railroad, which is a branch of the Grand Trunk in the Province of Quebec, north of New Hampshire, is to have the track laid immediately.

North Shore.

This company proposes to construct a railroad from Montreal down the north shore of the St. Lawrence to Quebec. The President, Hon. Mr. Cauchon, at a recent meeting of the company in Quebec, stated that the resources of the company were sufficient for the construction of the road. They comprised two Parliamentary grants of land—one of 1,200,000 acres in the Ottawa Valley, another of 1,500,000 acres in the St. Maurice district, a vote of $1,200,000 from, and the right of way into, the city of Quebec, as well as subscriptions to the amount of $500,000 from the municipalities on the route between Quebec and Montreal. They had, consequently, $1,700,000 in money and 2,700,000 acres to begin operations with, but it was necessary, to secure the land grants, the road should be completed before the first of January, 1873. At the conclusion of the President's remarks, Mr. Dinning, a well-known ship-builder, stated that the company's lands in the St. Maurice valley would be worth one dollar an acre as soon as the North Shore and Piles Railways were completed; and those in the valley of the Ottawa two dollars, so that the 1,500,000 acres in the St. Maurice territory would be worth $1,500,000, which, with the $2,4 0,000, value of the Ottawa grant, and the $500,000 subscribed by the municipalities, would form a total of $4,400,000. The company, consequently, only required a further sum of $1,300,000 to complete the road, the cost of the 190 miles at $30,000 a mile being estimated at $5,700,000. At the close of the meeting, a highly influential committee was appointed to popularize and promote the work.

Sabula, Ackley & Dakota.

The grading of the first twenty miles west from Sabula is rapidly progressing. Mr. Davis has the contract for this section, and also for the second section, upon the first mile of which—21st mile west of Sabula—work has been commenced. Fifty thousand ties and the iron for 20 miles have been purchased and are being shipped.

Pennsylvania Railroad.

The last acquisition of the great corporation is the Pittsburgh & Erie Canal and its large dock property at Erie. The Pittsburgh *Dispatch* says of it:

"As yet, no intimation is given of the intentions of the corporation in respect to the maintenance or the repair of the property. Opinion in Erie is divided as to what will be done. A few business men think it is the purpose of the company to abandon the property and force the transfer of its business to the Erie & Pittsburgh Railroad, of which the Pennsylvania Company have recently become the lessors. Others, and, as we believe the majority, are sanguine that the canal will be repaired, improved and maintained, and that, despite the monopoly of the carrying trade between Erie and the Ohio River now secured to the Pennsylvania road, there will be no increase in rates of freight and no injury to the business of the Erie. The fact that the corporation has leased the canal wharves strengthens the opinion that the canal will be operated as heretofore. There is business enough for both lines, water and rail, and it is to be hoped the new owners will give to boatmen along the canal assurance of their purpose to maintain and extend its business. The enlargement project may have been practical, but capitalists were never eager to invest in it. The men who climbed into office by its aid are really the only gainers by the long agitation the scheme has provoked. To the traffic of the canal in its present shape, the agitation for enlargement has been well nigh fatal. Boats have not been built and the capital formerly employed in the canal trade has been largely diverted to other enterprises. So, whatever are the purposes of the Pennsylvania Company, it is to be hoped they may soon be made public. If boatmen can be assured that the canal is to be repaired and operated without essential increase of tolls for a term of years that will justify the investment, they are ready to build new boats and then give an upward turn to a declining trade."

Laclede & Fort Scott.

The board of directors met on the 15th and 16th instants, to examine bids for the construction of the road-bed from Buffalo westward to the eastern line of Cedar county, as advertised some weeks since in the RAILROAD GAZETTE. The contract was awarded to Messrs. Shea & Burgess, of St. Louis, who also have the contract for grading the line from Lebanon to Buffalo.

A delegation of citizens from Carthage, Mo., and Baxter Springs, Kan., had an interview with the board, on behalf of a proposed extension of the road in a southwesterly direction from Bolivar, through Dade and Jasper counties, Mo., in the direction of Baxter Springs and Chetopa, Kansas.

A proposition was made from parties in St. Louis, representing eastern capitalists, to tie, iron and equip the road from Lebanon westward, as fast as the road-bed should be completed, in consideration of receiving for such service first mortgage bonds of the company running twenty years. A committee of directors, including the President, Secretary and Chief Engineer, was appointed to take the matter into consideration, with instructions to visit St. Louis and complete such a contract, if, in their discretion, it would seem for the best interests of the company to do so.

Wellington, Grey & Bruce.

This new Canadian railroad was lately operated from Guelph, 48 miles west of Toronto, northward to Fergus, fifteen miles. Trains will run through between Toronto and Fergus by way of this road, the Great Western, and Galt & Guelph Branch of the latter road. Six miles more of the road are to be opened this season, and hereafter it is to be extended northwest to Southampton, on Lake Huron about 50 miles north of Goderich, with, it is hoped, a branch to Kinsardine, further south, and another to Owen's Sound, an outlet of Georgian Bay 60 miles west of Collingwood.

Pekin, Lincoln & Decatur.

According to the Lincoln *Herald* this road has been leased in perpetuity to the Toledo, Wabash & Western Company; the former company to complete the construction and the latter to equip and operate the road.

Iowa & Minnesota Coal and Lumber Railroad.

This company has been lately organized for the purpose of building a line from the lumber regions of Minnesota through Central Iowa. Appeals are now being made for local aid and the interests seem to conflict, in some localities, with those of the Burlington, Cedar Rapids & Minnesota Company.

Selma & Memphis.

It is reported that General Forrest has temporarly suspended work on the Columbus end of the Selma & Memphis road on account of the depression in the sale of bonds caused by the European war, and also by the injunction to be decided upon by Chancellor Lyon.

North & South Indiana.

The directors have adopted the tow-path of the Wabash & Erie Canal for about one hundred miles south of Clay county as their line, and filed proposals to that effect in the counties through which it passes.

Indianapolis & Vincennes.

The city council of Vincennes, Indiana, refused on the 19th to give the company right of way into the city and grounds for the new depot and "such machine shops as the terminus of the road would require."

Green Bay & Lake Pepin.

The contract for building 40 miles of this road, from Green Bay to New London, has been awarded to R. P. Harriman & Co., of Green Bay. The work is to be completed by January 1, 1871.

Sioux City & Pembina.

Sioux City has still another railroad company organized on the 8th inst., to build a road northward to intersect the North Pacific at Breckenridge, the distance being 255 miles. John I. Blair and Oakes Ames, with their associate capitalists, are said to be backing the company.

Missouri, Kansas & Texas

A correspondent at Sedalia gives the following information: The track is now laid across the Osage River, 59 miles from Sedalia, having crossed that river on a temporary trestle. The work has been delayed for want of a sufficient number of locomotives. Three McQueen engines have been ordered from the Schenectady Locomotive Works and are expected in a few days. R. S. Stevens, General Manager, has been sick for some time past. O. B. Gunn, Chief Engineer, is acting in his place.

The Sedalia Division has been located from Fort Scott southwest about 35 miles to Osage Mission, which indicates that the junction with the main line will be made about 25 miles below Humboldt. It is said that the cars will be running to Osage Mission by the first of December.

St. Louis, Chillicothe & Omaha.

The Chillicothe & Brunswick, the Chillicothe & Omaha, and the St. Louis & Council Bluffs Railroad Companies have consummated a consolidation of their respective interests and lines, under the style of the St. Louis, Chillicothe, & Omaha Railroad Company. From Brunswick, on the Missouri River, the line is to form a chord of the great bend of that stream, and run to Council Bluffs, a distance of about 200 miles.

From Brunswick, on the North Missouri Railroad, northwest to Chillicothe, on the Hannibal & St. Joseph, 36 miles, the road is in operation. From Chillicothe northwest to Gallatin, 24 miles, the road-bed is very nearly ready for the rails, which are on the way from Europe. Contracts have been let and work is progressing on another section, from Gallatin to Gentryville, 30 miles, and the route is located to Clarinda, Iowa.

Gettysburg Railroad.

This road will be sold to foreclose mortgage at the Merchants Exchange in Philadelphia on the Thursday, Oct. 13. With it will be sold the franchise for an extension to the Potomac. The bondholders are not likely to make any combination to purchase the road, and it is likely that the Pennsylvania or the Reading company will be the purchaser.

Virginia & Kentucky.

The Bristol *News* says that two corps of engineers will be put on this proposed line about the middle of this month. It is to extend from Bristol, on the Virginia & East Tennessee Railroad at the north line of Tennessee, westward to Cumberland Gap, with connections through Kentucky to Cincinnati and Louisville.

California & Oregon.

This road is now completed to Solo Station, sixteen miles north of Chico. Northern travel is now principally by railroad.

Delaware, Lackawanna & Western.

The first trains on the Boonton Cut-off of the Delaware, Lackawanna & Western Railroad commenced running on the 12th inst. For a few months only coal trains will pass over; but as soon as the stations are put in order, passenger trains will be put on. The stations will be built at Denville, Boonton, Whitehall, Beavertown, Mead's Basin, Paterson, Clifton, Brandes, Sidney, Bergen and Hoboken.

Kankakee & Illinois River.

Ground was broken by the contractors for the section east of Dwight, last week.

Columbia & Port Deposit.

Messs. Wolf & Upp, who are constructing this road for the Pennsylvania Railroad Company, have commenced work on this line, which is to extend down the Susquehanna about 40 miles, connecting the Pennsylvania Railroad with Havre de Grace, at the head of the Chesapeake Bay.

South Pacific.

The line surveyed is from Neosho in an almost due southwest direction to Fort Gibson, at the junction of the Neosho River with the Arkansas, and a few miles above the mouth of the Canadian River, which rises in New Mexico. When the present company assumed control of this road which had so long been a line of contention among speculators, their movements were by many looked upon with distrust, and the public had no faith in the completion of the road. But this company have faithfully invested their capital and energy, and pushed the road through barriers of rock and hardpan, surmounted the hills and traversed the almost barren waste along their route till they are now in the fertile and fruitful Southwest, and are in a position to begin to enjoy a return for the very heavy expenditures they have made. Already the receipts of live stock by this road have largely increased, and will continue to increase as receiving and shipping facilities are perfected, and the route becomes known among cattle men. Besides this, the mineral products of all that prolific region will find this the most direct, speedy and economical line to St. Louis, or points further east, and we shall soon see trains loaded with iron, lead and zinc from the Southwest, for our city manufactories. * * *

—*St. Louis Journal of Commerce.*

Springfield & Illinois Southeastern.

The section which will complete the connection between Shawneetown and the Illinois Central at Edgewood will soon be completed. For some time cars have been running from Edgewood southeast as far as Mill Shoals, near the south line of Wayne county, a distance of 55 miles. Construction has been progressing lately from the southern end of the line, and last Saturday the road was completed from Shawneetown to the north line of Gallatin county, about fifteen miles, and now there remains only the section through White county to be built. On this section, which is 22 miles long, the contractors are hard at work, and the iron for it is on hand. By the first of September it is to be completed, and then trains can run through from Chicago to Shawneetown, about 310 miles.

Tennessee Railroads.

The State Commissioners have decided to sell at auction, on the 3d of November next, the State's interest in the following delinquent railroads, receiving State bonds in payment:

The Nashville & Northwestern Railroad; Cincinnati, Cumberland Gap & Charleston; Central; Southern; Edgefield & Kentucky; Memphis, Clarksville & Louisville; Knoxville & Kentucky; McMinnville & Manchester; Rogers & Jeffersonville; Winchester & Alabama; Knoxville & Charlestown; Evansville, Henderson & Nashville; East Tennessee & Western North Carolina, and the Mineral Home.

West Chester & Phoenixville.

The route of this proposed railroad is from West Chester, Pa., north by east to Phoenixville, on the Reading road 27½ miles northwest of Philadelphia, crossing the Pennsylvania Railroad at a station called Steamboat, 27 miles from Philadelphia and five miles north of West Chester. The section between West Chester and Steamboat is to be put under contract immediately.

Great Western of Canada.

The contract for the first section (38 miles) of the new loop-line from Glencoe to Canfield has been let to Henry Yates.

The company has taken up the third line of rails on its road as far as Chatham and will hereafter maintain only the 4 ft. 8½ in. track.

New York & Hempstead Plains.

This New Long Island road is completed from Hempstead to Valley Stream, where it connects with the South Side Railroad. Beyond the route has been changed, running further north, going through the villages of East New York, Woodhaven, and Springfield, besides skirting Flatbush. Work will immediately be commenced on the Bay Ridge division, and pushed rapidly to completion. The terminus at Bay Ridge has been secured by the company, and comprises 860 feet of water front. Van Dewaler Smith, of Hempstead, is President; C. W. Whiley, Treasurer; T. C. Goethius, Secretary. Capital stock, $300,000; one-half paid in.

Shenandoah Valley.

The Pennsylvania Central Improvement Company, which has the contract for constructing this road, advertises for 2,000 men to work on the section between Front Royal and Luray. When that is completed it is thought that the Martinsburg & Potomac Railroad will be in operation to Front Royal.

Leavenworth, Lawrence & Galveston.

The road is now open for some distance south of Garnett and very soon will be in operation to Humboldt and to New Chicago, six miles below, where it will cross the Missouri, Kansas & Texas road. When this connection is made, it will probably receive the largest part of the business of the latter road from points south of New Chicago until it has its own eastern outlet completed through Fort Scott to Sedalia.

The traffic of the Leavenworth, Lawrence & Galveston road is growing very rapidly since its connection with Kansas City was completed, and as it will soon be open to the south line of Kansas (near where the Verdigris River crosses the line, in Montgomery county) and will open a direct route to Osage lands, just now thrown into the market, its business may be expected to grow rapidly and its relations with lines further east become quite important. Already it has begun to share in the Texas cattle trade, and has now enough to support one stock train daily.

Keokuk, Iowa City & Minnesota.

The directors of the Iowa Northern Central and of the Keokuk & Minnesota Railroad companies held a meeting at Iowa City on the 16th, and finished consolidation, taking the name of the "Keokuk, Iowa City & Minnesota Railroad Company." The general officer are located at Washington, Iowa. The officers of the new company are George J. Boal, Esq., of Iowa City, President; Col. Patterson, of Keokuk, Vice President; A. J. Hershire, of Iowa City, Secretary, and W. H. Shipman, Treasurer, also of Iowa City. The *Tribune* says:

"The bonds of the consolidated company will soon be issued, the iron purchased, and track laying pushed forward to an early completion."

Ohio & Michigan.

This company give notice in our advertising columns that they will receive proposals up to the 17th inst. for making ready for ironing that part of their road between Allegan, Michigan, and the Indiana State line, a distance of 95 miles. The specifications will be exhibited at their office in Coldwater, Michigan, after today.

MECHANICS AND ENGINEERING.

Rails on Country Roads.

The New York *Evening Post* calls attention to the number of short branch lines in that State, and urges the necessity of some cheaper connections with the trunk lines. It says:

"There is not a railroad in the more thickly-settled parts of our country which might not profitably double its local traffic by the construction of numerous cheap branch lines. It is not necessary to lay such short auxiliary roads with heavy iron, or to use upon them the heavy cars and engines which are used on main lines. They could be much more profitably used if laid with light iron, and if the cars were light, perhaps of the shape of street cars, and moved by light dummy engines.

"To the unprofessional mind it does not appear even necessary that such branch roads should be accurately graded; why should not the track occupy a side of the public highway, and follow the curves and grades of that, where these are not too great?

"It would be a great benefit to country districts lying within from three to ten miles of a railroad, if some inexpensive method of laying light rails on common country roads could be devised. Such tramways many towns would construct and maintain as parts of the public highways, and for the use of all kinds of vehicles, just as our horse railroad tracks in the city are used by carts, drays and carriages. Our country roads, almost everywhere, are both poor and expensive. We have but few skilful engineers ready to construct first-rate, smooth, hard common roads. Is it impossible or too costly to lay the common roads with light iron rails for the general use?

Heywood's Snow Plow.

The *Official Railway News* describes as follows a snow-plow invented by C. L. Heywood, Superintendent of the Fitchburg (Mass.) Railroad, and used with success on the Vermont & Massachusetts, the New York & Flushing and other roads:

"It is a separate vehicle to run in front of the locomotive and armed with a plow of prodigious strength to clear away all snow and ice down to a level with the rails, and this is supplemented with scrapers for clearing the inside and outside edges of the rails down to the spike heads and chairs. In addition to this, the sides of the car of the plow are furnished with wings that, by means of brakes inside the car, can be set any required angle to the line of rails and will clear a passage five feet wide on each side of the track. The advantage of this ingenious arrangement is obvious, for, in the event of the plow striking any solid immovable substance, the wings close automatically and are reopened by the plow tender when the obstacle is passed. The whole work of plowing is so thoroughly done that the shoveling and snow pricking, generally necessary, and always very expensive, is dispensed with—the track being left as clear as in summer. By the form and construction of this plow, it can be run at any speed and no depth of snow can withstand its force. It is bound to go through. This machine is all the more valuable because it is calculated to do with a single engine the work which usually requires four or five."

Railroad Manufactures.

The Patterson *Press* says: "The reconstruction of the Rogers Locomotive and Machine Works will not be carried any further this year. The immense new mill, lately erected, is gradually getting into operation, and in a few months will probably be in use. It is driven by one of the finest overshot wheels in the city—an 80 horse power affair. The next re-building, it is thought, will be at the corner of Market and Spruce streets, but that will not be started before next spring."

The Tredegar Works at Richmond, Va., in addition to their other great enterprises, have undertaken the business of freight car building, and they are now sending these cars South at the rate of three per day. This new industry, so successfully introduced by this company, now gives employment and support, directly and indirectly, to over five hundred persons.

The shops of the Rutland & Vermont Valley and Montreal & Plattsburg railroads are at Rutland. The company builds its own engines there, under the direction of H. L. Davis, Master Mechanic, at an average cost of $3,000 each less than the cost of those furnished by locomotive builders. Mr. A. B. Allen, who has charge of the car shops, lately completed a drawing-room car, seating 38 persons and with room for 12 to sleep, at a cost not above $6,000. In finish and style it is pronounced equal to cars built elsewhere for which double that sum is paid.

Improvement for Horse Railroads.

Walter Cameron, of Taunton, Mass., has invented an ar icle to be laid on horse railroads in time of fire, so that cars may not be detained by the hose lying across the track. It is called a hose-bridge, is ingenious, of simple construction, made of iron, to be placed on each track, and locked or bolted, with a hole for the hose and a quarter circle covering, thus giving the cars opportunity to pass easily over the hose and prevent the blocking up of streets while a fire is in progress. This invention has been thoroughly tested.

A Wooden Railroad.

A railroad with rails of wood has recently been built from Quebec through the village of Jacques Cartier, about fifteen miles. The Quebec *Chronicle* speaks of it as follows:

"The problem of wooden railways for colonization purposes may now be said to be solved, and as a proof it is only necessary to say that we passed over the road yesterday at a rate of from twenty to thirty miles an hour, a speed which is seldom passed on any of the iron roads in this Province. The cars conveying the party yesterday were simply rudimentary vehicles, known as platform carriages, but sufficient evidence was given that the line when completed will be as easy and smooth for traveling purposes as upon the old established iron or steel rails. The road is built upon a 4 ft. 8½ in. gauge, being the ordinary width of the modern English and American railways. Each rail is 14 feet long, 7 inches in depth, and 14 inches in width—sawn and prepared at a temporary mill recently erected by the contractor on the line for the purpose. Each rail rests on several sleepers to which they are fastened by wedges—by a process so simple that the rail, when required, can be removed or reversed by any ordinary mechanic. The locomotive is from the Rhode Island Iron Works, and is most assuredly a splendid piece of mechanical ingenuity, while it is supposed to weigh 21 tons, loaded, without the tender.

Railroad Signal Box.

Mr. James P. Coulter, of Bloomington, Illinois, has invented a railroad signal which has been in use on the Chicago & Alton Railroad for the last eight months, and it may be inferred that it gives good satisfaction from the fact that Mr. McMullin, the General Superintendent, has ordered the entire line equipped with them. It consists of a box less than three feet high, and about six inches square, with a lid covering one side, and hinged at the top, which carries a flag-roller, which rolls and unrolls by the simple lifting up of the box-lid. A cord passes from the office of the watchman or operator to the lid of the box. When the lid is drawn up the flag is unrolled, and the signal flag appears. When not wanted longer, the lid is allowed to drop, which it does by its own weight, and the flag rolls up automatically, the box is closed, and the signal is withdrawn.

At night a lantern takes the place of the flag, and is placed in a small receptacle in the lower compartment of the box, lined with some metallic substance, for greater security. Upon the top of this compartment is a toothed wheel, in a small space by itself, with lugs which are fastened within the box. There is also a roller and pinion which turns the casing.

When the signal is to be given, a cord is pulled at the office, the case within turns its openings to the red or white light, as the case may demand, and the signal is given. The signal is withdrawn or changed by an equally safe and certain and easy process.

These signals can be set and operated upon the front of a depot, or on a curve, or on a bridge, or at a draw, and can be operated with perfect certainty, at almost any distance from the signal.

A red and white flag, or a red and white light can each be displayed from the same box.

Construction of Japanese Railroads.

The railroad which is being built between Yeddo and Yokohama is to have a 3½ ft. gauge, and will have cast iron sleepers something like the pot sleepers used on Indian railroads instead of wooden ties. The rails will weigh 50 pounds to the yard and will be of the double T form, so that they may be turned. Fish plates will be used at the joints, which will be suspended between two sleepers.

Rock Island Slough Bridge.

The Rock Island *Union* gives the following account of the connections being made, by the Chicago, Rock Island & Pacific company, with the new government bridge over the Mississippi:

"The old bridge across the slough has well nigh served its day and it is evidently the design of the company to have the new bridge done by the time the main bridge is completed. An entire reconstruction of the tracks on this side will then take place, so that the awkward reversing of trains to which they are now subjected, will be entirely avoided. The main track will begin to curve into the river a little east of P. L. Cable's residence, sweeping in so as to strike the present slough bridge 25 feet northeast of its Illinois abutment. Thence it will strike across the channel in a direct line to the government bridge.

"The first abutment on this side will stand 100 feet northeast of the abutment of the present railroad bridge. The track, up to this point, will rest on a causeway, forming a huge triangle with the old causeway and the Illinois shore for the other two sides. This area will be filled up and used for depot and side track grounds. All the shifting of trains will be done on this ground, thus relieving the bridge approach of the incessant annoyance which now obstructs it. Only the local freighting will be done on the old depot grounds.

"The coffer dam for the old abutment is already set. It is 40x44 feet outside measure. The crib was built on two barges, floated over to the old bridge, where it was raised by means of ropes and pullies, the barges drawn from under, the crib dropped into the water and then floated to its place where it was sunk by the aid of rock piled in it. Beside this abutment and the one on the Island end, there will be three piers 150 feet apart, mak-

ing a bridge of four spans, 600 feet in length. This bridge will be of iron throughout.

"The masonry will be of the best Joliet rock, a quantity of which is already on the ground, and a force of men engaged dressing it. The rock will be hoisted into place by means of a derrick, mounted on a huge square barge. Mr. A. Bruce is the contractor, a man of large experience in this line of business.

"The lumber used for coffers, barges, &c., is from Keator & Wilson's new mill. It is the design to push the work with vigor so as to complete the masonry this season if possible."

Snow on the Central Pacific.

The following is an extract from a letter written by a locomotive engineer on the Central Pacific to the *Locomotive Engineers' Journal:*

"There are places here where snow lies from winter to winter again. Even the iron horse seems to feel the effect of the light air. In the winter of '67, the railroad was operated to within fourteen miles of the summit; there were but few snow sheds, and it was necessary to plow the snow. Snow plows had been made and used the previous winter. Some time in the month of December of that year, the road was blockaded; it was found necessary to couple together a good team, which was accordingly done. The team consisted of nine ten-wheel engines, the largest engines this company owned. The nettings were all taken out of the stacks, about four cords of wood on each tank. Water was the least of our troubles; when the tank got low we could make more from snow. Our plow was no temporary concern, but well calculated for the purpose. When we would make a run at the snow, our engines would all be hot, say from 140 to 160 pounds pressure, you can form some idea of the power exerted. After having made a run, it would take over a hundred men from three to six hours to shovel us out, and several times our engineers and firemen ahead had to be dug out of the snow in their cabs. We were six days going five miles, and every engine came out of the snow alive. I speak of this to give you some idea of what we have to contend with in this part of the country. The snow belt extends about 40 miles in width. We have about 30 miles of snow sheds, without which the road could not be kept open during the winter."

Screw Reversing Levers for Locomotives.

The Worcester (England) Engine Company is manfacturing a large number of locomotives for the Nicholas Railway, Russia, to which are being attached the screw reversing gear invented by Mr. A. Alexander, of Worcester. The value of the screw gear, so far as it has been introduced, has been highly appreciated, owing to the accuracy and ease of adjustment which it is capable of, but the great difficulty hitherto encountered in its use lies in the fact that in cases of emergency it is impossible to reverse with promptitude. This is obviated by arranging the lever to be worked either by the screw or, when necessary, directly, by hand. In the latter case the straight cylindrical screw, which is rigidly fixed in the bearings at each end, acts in the place of the common notched quadrant. The motion of the detent in the lever is kept nearly parallel to the axis of the screw—so that the teeth of the detent will gear, in all positions of the lever, into the threads of the screw—by quite a simple parallel notion arrangement. Owing to this arrangement, together with the fact that the pitch line of the detent teeth is the arc of a large circle, about three teeth are in gear with the screw in every position.

A Chicago Street Locomotive.

Mr. D. J. Lake, of this city, who was the contractor for constructing the lake tunnel, has invented and constructed a peculiar road engine, which has been tried of late in our streets. It has the apparatus of a steam fire engine attached. The following description we copy from the Chicago *Times:*

"In an ordinary locomotive, the steam from the cylinder acts upon the piston and is communicated directly to the crank of the driving wheels. In Mr. Lake's machine, when desirable, the motion can first be communicated to balance-wheels. When these wheels have reached a very high rate of speed, the power can be communicated by a 'clutch' to the driving-wheels. The communication can be made gradually, or as rapidly as may be thought desirable.

"Anyone can see the benefit of this style of communication. Suppose the vehicle in a place where it requires extra force to start it. By applying the power at once no movement is effected; but by storing it up in the balance-wheels, and then communicating it to the drivers, one gets almost precisely the same benefit that he would by getting, say, a heavy wagon under rapid motion just before running it up an incline.

"He has another novelty. The machine has two sets of driving-wheels, one of which is considerably smaller than the other. By a simple use of the screw, either set can be raised, leaving the other on the ground. The power can be applied at will to either. The object of these two sets is, of course, to obtain either greater power or speed, as may be desired. In hauling heavy loads, the small wheels will be used, and in excursions, where there is no great weight to be hauled, rapidity is secured by the employment of the large drivers.

"A pump and air-chamber furnish a complete apparatus for throwing water; while a hand-wheel allows the transfer of power to a threshing-machine, or any other article of the kind.

"The engine itself is a very handsome one. It weighs about three tons, and moves without difficulty, and guides as easily as a well-trained horse."

ELECTIONS AND APPOINTMENTS.

—At a recent meeting of the Toronto, Grey & Bruce Railway Company the following were elected directors: Hon. John McMurrich, John Gordon, George Laidlaw, John Shedden, Wm. Gooderham, A. R. McMaster, H. S. Howland, John Morrison and Hon. D. L. McPherson. John Gordon, was re-elected President and A. R. McMaster Vice President. Subsequently Mr. McMaster resigned, when John McMurrich was elected Vice President, and B. Homer Dixon director.

—At the annual meeting of the stockholders of the Boston & Maine Railroad Company the following gentlemen were elected directors for the ensuing year: Francis Cogswell, Andover; Peter T. Homer, Boston; Nathaniel G. White, Lawrence; E. J. M. Hale, Haverhill; George C. Lord, Boston; Amos Paul, South Newmarket, N. H.; John E. Bickford, Dover, N. H. A vote was passed authorizing the issue of 4,500 shares of new stock.

—Notice is given that the annual meeting of the stockholders of the Western Union Telegraph Company will be held at the executive office of the company, No. 145 Broadway, New York, on the second Wednesday (12th) of October, 1870, at twelve o'clock noon of that day, and for such purpose the transfer books were closed on the afternoon of the 24th ult., and will be opened on the morning of the 13th of October, 1870.

—The incorporators of the Southern Transcontinental Railway Company have elected John C. Fremont, President, John D. Defrees, Secretary, and Marshall O. Roberts, Treasurer.

—Mr. W. H. Hull for a long time connected with the Missouri Pacific Railroad, has been appointed Eastern Traveling Agent of the Leavenworth, Lawrence & Galveston Railroad and will proceed immediately to post this road throughout its Eastern connections. This road having reached the fertile Osage reservation just coming into market it is desirable that this route become known to the traveling public.

—The officers of the consolidated New York & New Haven and Hartford & New Haven railroads will be as follows: Wm. D. Bishop, President of the New York & New Haven, President; Wm. P. Burrall, President of the Hartford & New Haven, Vice President; E. M. Reed, late Superintendent of the Hartford & New Haven will probably be Superintendent of the consolidated line.

—J. F. Fitzpatrick has been appointed night train dispatcher for the Laramie Division of the Union Pacific Railroad, with headquarters at Rawlings Springs, Wyoming Territory.

—At a meeting of the stockholders of the Memphis & Raleigh Springs Railroad Company, held at Memphis on the 1st ult., the following directors were elected: E. F. Babcock, E. W. Brooks, C. N. Taylor, A. B. Newkirk, J. T. Swayne, A. J. Kellar, Geo. K. Duncan, H. L. Brinkley, A. J. White.

—John J. Richardson has been elected President, J. J. C. Abbott, Vice President, and W. R. Worsley, Secretary and Treasurer of the Canada Central Railway Company.

—Gov. Onslow Stearns and Ex-Gov. Frederick Smyth have accepted the office of Receivers of the Concord Railroad, of New Hampshire, and have filed their bonds. They will enter upon the discharge of their duties immediately.

TRAFFIC AND EARNINGS.

—With a view to justify the resumption of lines of steamships from Boston to Europe, it is reported that the leading railroad lines converging at Boston contemplate arranging their freight tariffs that the rates may be the same to Boston as to New York on all Western goods intended for exportation.

—In connection with the progress of the New York & Oswego Midland railroad, of which 200 miles from Oswego are now completed, some statistics are given of the dairy business, which distinguishes the region through which this road runs. It is noted that a cheese-train is run every day from Syracuse to New York over the New York Central & Hudson River road. This train sometimes numbers as many as fifteen freight cars. There was exported for the year ending June 30, 1868, cheese to the value of $7,010,188, and, for nine months ending March 1, 1870, $7,181,640 of cheese.

—The following were the earnings of the Great Western of Canada for the week, ending September 2d, 1870:

Passengers	$35,778 50
Freight and Live Stock	50,661 57
Mails and sundries	1,701 77
Total receipts for the week	$88,071 84
Corresponding week, 1869	71,285 98
Increase	$16,785 86

—The Western Union Telegraph Company reports, as follows, its earnings and expenses for the month of July:

	1869.	1870.
Receipts	$593,670 01	$630,069 69
Expenses	412,895 02	428,012 78
Net profit	$180,774 99	$202,056 91

—The receipts of the Grand Trunk Railway for the week ending September 3 amounted to £29,800, against £31,200 in the corresponding week last year, showing a decrease of £2,300.

—The effect of the war on one of the principal railroads of France affected by it is shown by the following account of receipts of the Eastern Railroad of France for six weeks after the declaration of war:

Week ending.	Weekly Receipts		Inc.	Dec.
	1870.	1869.		
July 15	£96,979	£90,959	£6,020	....
" 22	118,115	90,088	28,027	....
" 29	119,698	87,922	31,776	....
Aug. 5	142,579	93,086	49,493	....
" 12	113,861	97,763	16,098	....
" 19	69,671	108,184		£38,513

We may imagine that the receipts now are reported only to the Prussian war department.

—The traffic receipts of the Grand Trunk of Canada for the week ending September 10 amounted to £30,600, against £32,500 in the corresponding week of last year, showing a decrease of £1,900.

—The traffic receipts of the Great Western of Canada for the week ending September 9 amounted to £17,448, against £15,372 in the corresponding week of last year, showing an increase of £2,076.

PERSONAL.

—Henry Bessemer, the inventor of the celebrated Bessemer steel process, has been elected President of the Iron and Steel Institute of Great Britain.

—The locomotive engineers employed on the New York Central Railroad have presented to Charles Wilson $253 as a token of their appreciation of his services as Grand Chief Engineer of the Brotherhood of Locomotive Engineers.

MISCELLANEOUS.

—The Rolla, Mo., *Express* gives the following account of "unprecedented, unexpected and unnecessary" fast time made on the South Pacific Railroad:

"A heavy car of lumber got away with two men in charge, on the down grade of eighty feet to the mile. With each succeeding mile the speed of the flying car became more terrific, and as it passed the tank five miles west, the velocity was doubtless mor than one hundred miles an hour One of the men did not notice the long bridge, and merely took the awful chasm which it spans, for a small ditch. Even passenger trains pass this bridge with the greatest caution, but the style in which this car made the successful 'leap for life' was a 'caution' in a widely different sense. Fortunately an up grade arrested the killing pace some six or eight miles west of Rolla, and the car was switched off at York's just in time to prevent a crash with the freight train east, which being behind time had not passed that point. It seems providential that so many dangers could have been missed. A gentleman walking on the track towards town barely had time to step off, at the first sound of its thundering progress, which was more like a cannon shot than a wheeled vehicle."

—The Erie Company owns at least a million dollars worth of taxable property in Hudson county, N. J., and the assessor has found out that a "special act" of the Legislature last winter exempted it all from state, county and municipal charges. The company has heretofore been paying about $75,000 a year taxes, consequently that "special act" is worth something.

—The projected union passenger station at Albany will shortly be commenced. The plans show it to be the largest passenger depot in the United States. It will be located in the rear of the Delavan House, and is designed for the use of the Boston & Albany, Hudson River, Harlem, Albany & Susquehanna, New York Central and Saratoga Railroads.

Colorado Central.

This railroad was opened for business between Denver and Golden City, about fifteen miles, on the 23d ult.

RAILROAD GAZETTE

PUBLISHED EVERY SATURDAY.

CONTENTS.

INDEX TO RAILROAD ADVERTISEMENTS.

Editorial Announcements.

Correspondence.—We cordially invite the co-operation of the Railroad Public in affording us the material for a thorough and worthy Railroad paper. Railroad news, annual reports, notices of appointments, resignations, etc., and information concerning improvements will be gratefully received. We make it our business to inform the public concerning the progress of new lines, and are always glad to receive news of them.

Inventions.—Those who wish to make their inventions known to railroad men can have them fully described in the Railroad Gazette, *if not previously published,* free of charge. *They are invited to send us drawings or models and specifications. When engravings are necessary the inventor is expected to furnish his own engravings or to pay for them.*

Engineering and Mechanics.—Mr. M. N. Forney, Mechanical Engineer, whose office is at Room 7, No. 72 Broadway, New York, has been engaged as Associate Editor of this journal in charge of these departments. He is also authorized to act as our agent

Articles.—We desire articles relating to railroads, and, if acceptable, will pay liberally for them. Articles concerning railroad management, engineering, rolling stock and machinery, by men practically acquainted with these subjects, are especially desired.

Change in Rates.—On and after the 1st of January next, the price of subscription will be four dollars per year. Until that time, subscriptions will be received for periods not exceeding one year at the old rate—three dollars per year.

☞ *Our Prospectus and Business Notices will be found on the last page.*

TESTING NEW INVENTIONS.

It is so frequently suggested that railroad companies should adopt some systematic plan for testing the merits of new inventions, and the suggestion is supported by such very plausible reasoning, that we sometimes are induced to believe for the time that railroad managers are very stupid and short-sighted in not undertaking to do what has been proposed. There are men who have the management of some of our railroads who obstinately resist the introduction of *any* new thing or the making of any experiment. We once heard one of this class express the opinion that the person who "got up" a new-fangled notion ought to be subject to legal penalty. The old money-bags did not seem to know that the dividends of his road, which he put into his pocket with so much consolation to himself, were the result of certain "new-fangled notions" which people like Stephenson, Bessemer and others "got up." The trouble with men of the class we have referred to is, that they seem to be without the power of discriminating between an invention which is good and one which is not, or an inventor who is conscientious—and there are such—and knows what he is about, and one who is incapable of *thinking* the truth, let alone speaking it. The quiet, cautious, thoughtful man, who carefully and thoroughly studies his subject before he ventures to suggest changes or improvements, is usually the one of all others who possesses least of the faculty of blowing his trumpet; while the blather-skite chap, who perhaps never thought on one subject ten minutes consecutively in his life, is fearfully and wonderfully constituted in his capacity to keep up a sustained stream of words.

Now it is this latter class of inventors who have of late done so much to prejudice railroad men against new inventions or experiments. By reason of much plausible talk, they succeed in persuading unwary managers of the money-bags class to buy impracticable devices or worthless material with which the vender, if not inventor, is always prepared to save enormous percentages of fuel or expense. After being in use for a time it fails, with much inconvenience and loss to the company, as the master mechanic probably could have predicted it would if he had been consulted. The result is that thereafter the old gentleman is "down" on *all* "new fangled" notions, and when any one presents something which is really valuable, money-bags will have nothing to do with it. It would be just as reasonable to refuse to buy any mineral oil and to return to the use of sperm, because a barrel of the former was found not to have good lubricating qualities.

There are other causes, too, which make railroad managers indifferent if not adverse to inventions and inventors. A month's experience in the office of almost any superintendent of a leading road would perhaps enable those disposed to find fault with the general want of appreciation of "new ideas" to understand the views of the subject which the superintendent has, and share it, perhaps, also. To be obliged every day or two to listen to the crude notions of visionary schemers who do not understand the subject they are talking about, and to hear the incoherent reasoning of over sanguine and importunate inventors who are afflicted with the lunacy of ingenuity, is enough, in time, to deaden all sensibility to the value of "improvements." The *safety* of conservatism, too, is a tempting refuge to an over-worked official with a reputation at stake. Of all new inventions, probably nine out of ten are worthless; therefore, to decline *all* is to be right nine times and perhaps only partially wrong once.

Not to try any experiment and yet reap all the benefit of those made by others is as narrow-minded and selfish as for a person who lives on a dusty street to refuse to contribute towards defraying the expense of having it watered, which all the other residents pay.

The question, we think, is not whether railroad companies should try *every* new invention, or make any experiments, but *how* it should be done. If all inventions should cease, of course improvement will stop, and we shall soon get into a sort of Chinese dead-level condition. We do not believe we are misstating a fact when we say that a majority of our older railroad companies would not object to any reasonable outlay for this purpose, if they could be convinced that it would not be misapplied. If an association were formed by the railroad companies, as has been so often suggested, for the purpose of experimenting, the danger would be, as is so apt to be the case, that the board or executive of the organization, in whatever form it might be constituted, would be manipulated by the sharpest and least scrupulous schemers, for the purpose of giving the latter an opportunity of riding own hobbies.

If, on the other hand, some liberal-minded board of directors should invite the authors of new inventions to present their "ideas" for consideration, and announce that they were prepared to spend, say $10,000, in testing the value of the most promising of them, we are led to believe, from our own knowledge of the peculiar idiosyncracies of the class of people who would comply with the invitation, that after such a proposition should be made, if a person were in search of peace of mind, he would not be likely to find it either in the office of the Superintendent or Master Mechanic of the road where the board was thus liberal-minded. We can imagine, what with models of patent brakes, and impossible spark-catchers, and devices for impaling runaway cattle, self-couplers, and samples of all sorts of metals, and phials of vile smelling oil, the sort of curiosity shop these places would soon become; and that what with the theories of half-crazy schemers, it might speedily drive into hopeless lunacy the unfortunate superintendent or master mechanic who frequented it.

Perhaps the best plan which can be pursued is the one which in a sort of tacit way is now acted upon by some railroad companies, which is to permit the expenditure of greater or less sums of money from time to time on new and promising projects, by the advice or recommendation or through the discretion of the officers. If the officers of each road were thus allowed each year to experiment in one or more directions, and were carefully to record the result of the experiments and disseminate the results through the proper channels, a great deal of valuable information could be accumulated with comparatively little expense. The project could be systematized by the Master Mechanics' Convention, if they were to assign to the committees not only subjects on which to report, but subjects on which to experiment. We believe that if a petition were properly made to the railroad companies a large majority of the older ones would be willing to comply with the request by appropriating for the purpose much more than would be sufficient to defray the expense. The expenditure of money need not be large in making such experiments. Take for example the much discussed question of wagon-top or straight-top boilers, or of the position and number of domes for a locomotive boiler. No expense, or, at least, very little, would be necessary to try a series of experiments which would probably set at rest a number of vexed questions. It would only be the use of the machinery and the men which would be required for the time. The relative economy of the various kinds of oil for lubricating or illuminating purposes, the power required to draw cars with certain appliances attached to them, and a dozen other questions which are now in doubt, could at least have much light shed on them if such experiments were carefully made and recorded.

GOVERNMENT MANAGEMENT OF RAILROADS.

All branches of business and all classes of society are more or less troubled by those meddlesome persons who are ever ready to find fault with anything in which they do not control. There was abundant proof of this during our late war, and doubtless the contest was greatly prolonged by interference in military operations by citizens whose influence was great but whose knowledge of the arts of war was not such as would entitle them to any voice in the matter. Every man in charge of public affairs in this country is subject to annoyance from these meddlesome people, but railroad managers more than any others holding responsible positions in either public or private affairs have their management criticised and condemned. It is true that American railroad management is not altogether and everywhere what it should be, and in many instances the occupation of the fault-finder may be said to be advantageous to the public. But there is a wide difference between fair, honest criticism and abuse; and the latter is frequently used more freely than is either pleasant or profitable.

It is impossible however in treating this subject with candor to ignore the fact that the affairs of some of our railroad corporations are managed so slackly and with such apparent disregard of the public interest as to warrant severe condemnation. This recklessness has at times been manifested to such an extent as to excite the public greatly and cause a demand for a general reform in railroad management. Influential citizens have from time to time agitated the question of a "railroad reform," and various methods are proposed to effect it. Some propose to accomplish it by the enactment of more stringent railroad laws, while others demand that Government assume control of the entire railroad system.

The latter proposition meets with some favor from the public at large, and some prominent citizens have made strong efforts to get the matter before Congress. These efforts have been only partially successful, but, probably enough, may receive further attention hereafter.

Immediately after the close of the war some New England roads were, to speak mildly, unfortunate. Several serious disasters followed each other in rapid succession. It was at this time that a clamorous demand was made that at least such roads as had been particularly unfortunate should at once come under the control of an officer appointed by Government. During the war these roads had been permitted to become wholly unfit for traffic. Sleepers were decayed and rails were so worn and broomed as to be unsafe. Bridges were out of repair and the rolling-stock in a wretched condition. The consequence of all this was the loss of many lives and much property, and the public justly claimed a right to interfere, inasmuch as they were a party interested. They claimed that many of these roads never would have existed but for the aid of the public; that they depended also on the same class of citizens for support to which they were indebted for their existence. They argued that although these roads were a public necessity and were built to satisfy a public demand, yet the people had given their lands and given and loaned their money, and assisted in every possible manner in order that these roads might be built and operated in a safe and thorough manner. They were unwilling to submit longer to this murderous state of affairs and demanded that operations be suspended until the roads and equipage should be put in a safe condition.

These were aggravated cases, and the complainants were certainly entitled to sympathy. Although the de-

mands of the complainants were not complied with, they were not without their beneficial effects, for the roads most open to censure soon put track and rolling-stock in good condition, and the people were satisfied for a time; but on the occurrence of a fresh accident the excitement breaks out anew, and every railroad manager in the country is treated with a storm of abuse.

But can a reform in railroad management be effected by transferring the control of our railroads from the present proprietors and managers to the Government? Those who favor this proposition tell us of the remarkable manner in which the railroads controlled by Government for military purposes were managed during the war. It is true there were some remarkable performances on our military roads, and the rapidity and safety with which large armies and their supplies were transported from place to place was often truly astonishing and probably not equalled elsewhere in the entire history of railroad operations. With these facts before them, some men urge that our roads would be better managed if they were controlled by Government. Probably those who take this view of the matter lose sight of the fact that these remarkable performances were accomplished as military necessities, when the safety of the country required it, entirely regardless of the expense, which would have been ruinous in ordinary railroad practice. With the immense resources of the country at their command, and no considerations of economy to interfere, it was not so difficult a matter to perform extraordinary feats in transportation as it would be with limited means and a view to economy and profit.

Another important fact which seems not to be remembered is that the United States military railroads were managed by some of the most expert railroad men in the country, who before the war were in charge of the most successfuly managed roads then in operation, and that nearly all of these men are still acting in the same capacity. It is therefore manifestly impossible for government to place the management of our railroad system in the hands of more competent men than those who now control the leading roads.

It is hardly practicable for one party to own a road and another to manage it, and the only possible plan whereby the government may control railroads is by purchase. If the government should purchase all the railroads in the country, some of them would be sold for many times their value, and who would guarantee that the whole transaction would not be managed by "rings" of politicians, such as have managed the collection of the whisky tax with such notable advantage (to themselves) and are pretty sure to have a hand—oftener both hands—in any government transaction that "has money in it?" Every branch of the public service is infested with these rings of plunderers, and it should be the aim of every honest citizen to prevent as far as possible the necessity of increasing the number of government servants until we have learned to make them honest and efficient. As soon as any new department is formed, no matter how honest and able the officers may be who are placed at its head, thieves will manage to get positions giving opportunities for stealing. If the government should undertake the control of our railroads, either by purchase or otherwise, it would afford opportunities for swarms of hungry politicians to feather their nests at the public expense. Men would be appointed to responsible positions with no other qualification than political influence, and the much talked of reform would not be effected but indefinitely delayed. Experienced and able men would be removed for the mere expression of a political opinion distasteful to some of the "powers that be," and men wholly incompetent would be appointed in their places as the reward of political services.

From the daily accounts of frauds by the government officials, it would appear a difficult matter for the administration to perform its present duties without great loss by dishonest servants, and it would be as sensible for a merchant or banker to entrust the key of his safe to a professional burglar as for the people to place the management of the railroad system in the hands of the Government with the expectation of reform.

It is not proposed here to deny that there are serious causes for complaint in the management of some of our railroads, but if there is to be a change, let it be for the better, and not for the worse. That our railroad management is improving, no one will deny.

There is of late much complaint about "railroad monopolies," the outrageous charges for freight and passengers, etc. This is said by some to be the result of consolidation, which may be true in some cases; but it is demonstrated beyond question that several short lines can be operated under one management with far greater safety and economy than otherwise; and here is where the government might, perhaps, exercise power to advantage, and perhaps a little wise legislation will be necessary to protect the public against some abuses.

It may be strongly suspected, however, that those who are loudest in their demands that the government assume entire control of the railroad management are not prompted by purely disinterested motives. The present political situation renders it necessary for certain politicians to perform some great strategic movement, otherwise "their occupation's gone." By getting the railroads to manage they would have an immense patronage at their command, which, doubtless, they could (and would) make profitable to themselves with very little respect to the public interests.

The managers of some of the leading corporations have already disgracefully lent their aid to scheming politicians, and there is many a rogue now in a good position for plunder placed there by the assistance of railroad managers who have thus secured his services in securing legislation which they can make profitable.

As above stated we need improvement and reform in railroad management, but it cannot be effected by putting it into the hands of the government, nor by the persistent abuse of all the railroad men in the country. It is altogether unfair that the whole class should suffer for the shortcomings of a few. If those who are loudest in their denunciations will take a cool view of the matter, they will not fail to notice a marked improvement in railroad management of late, and present indications are that the few remaining causes for complaint will soon be removed. The control of the railroads by politicians would be the worst possible calamity, and would, doubtless, prevent for many years improvements in transportation which now are made as rapidly as possible.

IMPROVEMENTS IN SIGNAL SYSTEMS.

Among the important items of railroad improvements in these days of "special New York expresses" is that of signals, which show the engineer as he approaches a station at a high rate of speed that switches are right and that he is sure of going safely through. This by day is shown by various devices. At night lights can be used to signify the same thing, and our best roads either have in use or are adopting some device for this purpose. Several accidents within the past year have impressed upon the minds of those interested the necessity of this. This subject has been discussed, numerous experiments tried, and many kinds of lighted switches invented. It matters little which is used, but it is certain that our first-class roads cannot afford to go without some one. Another item seems to have been overlooked. Within the last ten years the telegraph has come into general use as an aid in the movement of trains, but as yet no perfect system of signals has been adopted by which those in charge of trains can know as they pass stations whether orders may be expected or not. They may see a signal to stop for orders—or they may not see anything. If one is seen they know they must stop. If not, they are uncertain about it. If this signal is in the hands of a man, he may not always bein the sameplace, and thus the engineer is not sure where to look. The man may neglect to show any signal at all. Many cases of this kind have occurred—one was noticed on page 604 of the RAILROAD GAZETTE, of September 24. In that case the telegraph operator had been instructed to hold one train until another arrived from the opposite direction, but falling asleep, it passed unnoticed by him, and a collision followed. Had some good signal been used, this could not possibly have occurred. And by a good signal is meant one that is *positive* in its information to the train. It must show that there are orders or that there are none and leave nothing in doubt. An engineer is not satisfied when he does not see a signal of danger at a switch,—he wants to see a signal of safety. So with the "telegraph order signal." We must have something that is a safety signal as well as one of danger. We are glad to know that one road running out of this city is moving in the right direction, and the result of their experiments has been the production of a signal which with Miller platforms, and steel rails, and palace sleeping cars must become a fixture upon roads that have the safety and comfort of their patrons and employes in mind. Let us hope for an early development and adoption of this or some other equally good device.

The Superintendency of the Union Pacific.

Reports have prevailed for some time that Col. C. G. Hammond, for fifteen months past General Superintendent of the Union Pacific Railroad, would be removed from his position if a certain party in the directory should obtain control, and within a few days a report has been published that he has offered his resignation, and that it has been accepted.

We understand that the question which has divided the directory has had relation to the eastern terminus of the road. One party, among whom are Gen. G. M. Dodge, late the Chief Engineer of the Union Pacific, Hon. J. F. Wilson, late a member of Congress from Iowa and one of the most influential men of the West, and Hon. Hiram Price, also an an ex-member of Congress with unusual influence in politics, have labored to establish the terminus of the road with its chief transfer station on the Iowa side of the Missouri, in the city of Council Bluffs. It is their design to construct the bridge as soon as possible and keep the control of it in the Union Pacific exclusively, so that no trains from this side of the Missouri should cross over to Omaha, but that all traffic to and from them should be transferred to the Union Pacific at the Council Bluffs station, where all the Union Pacific trains would be made up and whence they would start, making Omaha a way station where trains would stop only to discharge and take on freight and passengers. The other party is known as the Omaha party. It has not opposed the construction of the bridge, we believe, but it has labored to retain the chief terminal station in Omaha. With the latter party Col. Hammond has been in sympathy. He made a strenuous effort to compel the eastern roads to provide entirely for the transfers between Council Bluffs and Omaha and has been regarded as one of the most energetic and powerful supporters of the Omaha interest.

It would hardly seem necessary for the other party, on obtaining power, to discard so able a servant as Col. Hammond has been. His success in operating the Union Pacific has surprised even those who were most familiar with the ability he had manifested on the Chicago, Burlington & Quincy, which had led many to regard him as the ablest railroad superintendent in America. He took the road when it was in bad condition, in debt, in many respects poorly officered, and with its working force in a disorganized condition, having just left the hands of the constructors, who had necessarily devoted their entire energies entirely to rapidity of construction and had paid little attention to operation. He found this enormously long line laid through a wilderness with less local traffic than there is on a hundred miles of many a prosperous Illinois railroad, and with a light through traffic not easily increased. In his hands the operating department has been so thoroughly organized that it may compare for efficiency with any in the country, the traffic has been developed as much as was possible under the circumstances, the road and its equipment put into such condition that almost every railroad man who passes over it wonders at its excellence, and, especially has secured such economy in operation that the expenses in this wilderness where wages are high and materials very dear, on a line which usually supports but one passenger and one freight train daily, are less in proportion to the earnings than those of many roads with a heavy traffic. Certainly, he who takes Col. Hammond's place will find it very hard to equal his efficiency, though the most difficult work, that of organizing and educating the working force, will be already done for him.

Brotherhood of Locomotive Engineers.

The annual convention of the Brotherhood of Locomotive Engineers will be held in Nashville, Tenn., on the 19th inst. Delegates to this convention will be passed on their way over the following roads on presenting their credentials:

Erie Railway; Lake Shore & Michigan Southern; Cleveland, Columbus, Cincinnati & Indianapolis; Pittsburgh, Cincinnati & St. Louis; Little Miami; Louisville, Cincinnati & Lexington; Kentucky Central; Louisville & Nashville; Marietta & Cincinnati; Cheshire; Nashville & Chattanooga; Nashville & Northwestern; Richmond & Petersburg; Virginia & Tennessee; Selma, Rome & Dalton; Memphis & Charleston; Western & Atlantic; Philadelphia, Wilmington & Baltimore; Illinois Central; Toledo, Wabash & Western; Louisville, New Albany & Chicago, Indianapolis, Cincinnati & Lafayette; Cincinnati, Hamilton & Dayton; Baltimore & Ohio; North Missouri; Michigan Central. They will also be passed on their credentials by the Kansas City, St. Joseph & Council Bluffs road, by presenting them to the engineers first. Passes will be granted on application properly endorsed to the superintendents over the Chicago & Northwestern; Hannibal & St. Joseph; Connecticut River; Pennsylvania; Georgia; Boston & Albany. Applications for passes over the New York Central should be made to P. M. Arthur, West Albany; over the Northern New Hampshire & Concord to L. C. Woods, Box 328, or John Carter, Box 664, Concord; over Pittsburgh, Fort Wayne & Chicago, to S. D. D. King, No. 89 Manhattan street, Allegheny City, Pa.

The headquarters of the delegates in Nashville will be at the Maxwell House.

—A traction engine and car are on the way from Scotland to Arizona to be used in hauling ore for the Vulture mine.

Chicago Railroad News.

The General Ticket Agents' Association.

REPORT OF THE SEMI-ANNUAL CONVENTION.

The excursion party of general passenger, ticket and freight agents to the Pacific coast did not arrive Tuesday afternoon, as was originally intended and expected, but were a day late. There was a small gathering of such agents as did not go with the excursion Wednesday morning, but they immediately adjourned until Thursday morning.

At that time the session commenced, Mr. A. A. Barnes, of the Memphis & Charleston Railroad, presiding with much dignity and self-possession, and Samuel Powell, of the Chicago, Burlington & Quincy, acting as Secretary.

Just before the session of the Association, a meeting of the company publishing the *Official Railway Guide* was held. Its proceedings are reported elsewhere.

Mr. A. V. H. Carpenter, Chairman of the Committee on Credentials, reported the following names of delegates entitled to seats in the Convention:

Albany & Susquehanna Railroad—S. E. Mayo.
Allentown Line—H. P. Baldwin.
Atlantic & Gulf Railroad—C. D. Owens.
Baltimore & Ohio Railroad—L. M. Cole.
Burlington & Missouri River Railroad—A. E. Touzalin.
Camden & Amboy Railroad—J. W. Gore.
Chicago, Burlington & Quincy Railroad—Samuel Powell.
Chicago & Northwestern Railway—H. P. Stanwood.
Chicago, Rock Island & Pacific Railroad—E. St. John.
Cincinnati, Hamilton & Dayton Railroad—Samuel Stevenson.
Cincinnati & Indianapolis Junction Railroad—J. A. Semple.
Cleveland, Columbus, Cincinnati & Indianapolis Railroad—S. F. Pierson.
St. Louis & New Orleans Packet Company—John N. Bofinger.
East Tennessee, Virginia & Georgia Railroad—Jas. R. Ogden.
Illinois Central Railroad—W. P. Johnson.
Indianapolis, Bloomington & Western Railroad—N. E. Scott.
Indianapolis, Cincinnati & Lafayette Railroad—A. E. Clark.
Indianapolis & St. Louis Railroad—John. S. Garland.
Jeffersonville, Madison & Indianapolis Railroad—S. E. Carey.
Louisville & Cincinnati Short Line Railroad—Henry Steffee.
Louisville & Nashville Railroad—W. H. King.
Marietta & Cincinnati Railroad—J. W. Pillsbury.
Memphis & Charleston Railroad—A. A. Barnes.
Merchants' Southern Packet Company—E. B. Byington.
Michigan Central and Great Western Railroads—C. D. Whitcomb.
Milwaukee & St. Paul Railway—A. V. H. Carpenter.
New York & Oswego Midland Railroad—W. H. Weed.
North Missouri Railroad—James Charlton.
Ohio & Mississippi Railroad—C. E. Follett.
Pennsylvania and Philadelphia & Erie railroads—H. W. Cowinner.
Pennsylvania Railroad—D. M. Boyd, Jr.
Philadelphia, Wilmington & Baltimore Railroad—G. A. Dadmun.
Pittsburgh, Cincinnati & St. Louis Railroad—S. F. Scull.
Pittsburgh, Fort Wayne & Chicago Railway—F. R. Myers.
Springfield & Illinois Southeastern Railroad—John Foggett.
Toledo, Wabash & Western Railroad—J. U. Parsons.
Union Pacific Railroad—Francis Colton.
United States Mail Line Steamers—James Ferrier.
Western & Atlantic Railroad—B. W. Wrenn.
Red River Steamers—James Kerr.
Orange, Alexandria & Manassas Railroad—J. B. Gates.
Lake Superior & Mississippi Railroad—W. S. Alexander.
St. Paul & Sioux City Railroad—J. C. Boyden.
Cleveland & Pittsburgh Railroad—W. C. Cleland.
North Carolina Railroad—S. G. Allen.
Cartersville & Van Wert Railroad—L. M. Harris.
Central Pacific Railroad—T. H. Goodman.
Providence & New York Steamers—L. W. Filkins.
Leavenworth, Lawrence & Galveston Railroad—C. B. Peck.
Mobile & Ohio Railroad—C. L. Fitch.
New Jersey Railroad & Transportation Company—F. W. Rankin.
Delaware, Lackawanna & Western Railway—W. F. Holwell.
West Jersey Railroad—J. W. Allen.
Mississippi & Tennessee Railroad—C. P. Oakley.
Missouri Pacific Railroad—W. B. Hale.
Winona & St. Peter Railroad—A. J. Mead.
New Orleans, Jackson & Great Northern Railroad—J. W. Scott.
North Pacific Transit Company—W. M. Nielson.
Memphis & Arkansas Railroad—S. W. Shock.
Des Moines Valley Railroad—James Barker.
Toledo, Peoria & Warsaw Railroad—H. Z. Main.
Chicago & Alton Railroad—A. Newman.
Rockford, Rock Island & St. Louis Railroad—J. P. Whitehead.
Peoria, Pekin & Jacksonville Railroad—J. S. Cook.

The business in order being the selection of a place of meeting for the next spring meeting Mr. C. D. Owens of the Atlantic & Gulf Railroad, nominated Savannah and presented an invitation on the part of that city. Mr. B. W. Wrenn, of the Western & Atlantic Railroad nominated Atlanta and promised the hospitalities of that city. On calling the roll there were 44 votes for Savannah and 11 for Atlanta.

The thanks of the convention were tendered to Atlanta for its invitation.

The Executive Committee reported that the action of the several roads concerning special rates to commercial travelers might be considered with interest, and that the subject of English and Australian travel by way of America would be presented to the convention.

The following report was made by D. M. Boyd, Jr., L. M. Cole, and George A. Dadmun, a special committee appointed to confer with the Quartermaster General relative to his adopting the *Official Railway Guide* as the authority for distances and railroad information in his department:

"The committee appointed at the annual meeting of the Association held in New York, March 30, 1870, to confer with the Quartermaster General of the United States and solicit the adoption of the *Travelers' Official Railway Guide* as the standard authority in the Quartermaster's Department for railway distances and information have the honor to report as follows:

"On the 11th of June, the committee called on General Meigs and made known their appointment and the request of the Association. They were accorded a kind reception and the assurance of an impartial consideration of the merits of the Guide, to the distinction asked for it, which they were requested to submit in writing.

"On the 15th of September the committee handed in their written argument accompanied by letters of the most favorable tenor, from 26 prominent railroad presidents and superintendents, which they secured by correspondence. Several additional letters have been received since our communication was forwarded.

"On the 24th of September the following reply was received:

"'War Department.
Quartermaster General's Office,
Washington, Sept. 29, 1870.

"'Messrs. D. M. Boyd, Jr., George A. Dadmun, and L. M. Cole, Committee of the General Ticket Agent's Association of Philadelphia, Pa.:

"'*Gentlemen:*—Your letter, without date, in relation to and requesting the recognition of the *Travelers' Official Railway Guide* as the standard authority in the Qquartermasters' Department for railway distances and information, and enclosing papers in relation thereto was received.

"'In reply, you are respectfully informed, that your communication has been carefully considered, the two guides contrasted, and that the *Travelers' Official Railway Guide* is accepted as the standard in the Quartermasters' Department.

"Respectfully, Your Obedient Servant,
"M. C. Meigs,
"Quartermaster General and Bvt. Major General, U. S. A.'

"The recognition of the *Guide* by the Quartermaster's Department is convincing proof of its intrinsic merit and superiority, while the strong endorsement bestowed upon it by railroad managers when appealed to is an evidence of the necessity of the work and of their full endorsement of the enterprise. Copies of all the correspondence connected with the labors of the committee are at the disposal of the convention.

At this time Mr. Wm. Neilson, of the San Francisco *Alta California*, was invited to address the association on the subject of the English and Australian trade and advantages of diverting it from the Suez and Ceylon route to the route across America and the Atlantic and Pacfic oceans. He gave the number of passengers between England and Australia last year as amounting to 60,000 persons, and the amount of first-class fares $5,540,000. At present, of the American trade of $20,000,000 per year with Australia, three-fourths go by way of England, though our Pacific coast itself is but 6,000 miles from the colony. At present immigrants who must take the cheapest route must go by sailing vessels around Cape Horn, a distance of $16,000 miles. By the Peninsular & Oriental steamers first-class fare from England to Australia by the Suez Canal is $600, and the time occupied is 52 days. At the present time by taking a steamer from Liverpool to New York, rail from New York to San Francisco, and (should a line of steamers be established) a steamer from San Francisco to Australia, the journey could be accomplished in 38 days and for $400. Moreover this would be one of the most interesting and comfortable journeys possible, the most disagreeable part being the passage of the Atlantic. The people of Australia are ready to grant one half of the subsidy necessary to establish such a line; if the other half can be obtained from the United States, the line will be established at once. The Association is asked to consider the propriety of making special rates which might aid in attracting business to this channel.

Mr. Neilson's address was referred to the Executive Committee which reported thereon as follows:

"The Executive Committee appointed to report upon the Australian traffic question, have agreed to the following:

"The Executive Committee appointed to report on the questions raised by Mr. Neilson, beg leave to submit that, fully appreciating the importance of perfecting arrangements for securing the business traffic between Australia and the Old World, report that Mr. Neilson be requested to supply his remarks for publication, together with such other data as he thinks proper, for the use of this association. That each member supply his general managing officer with a copy, and request his co-operation and influence toward securing the passage of a bill by Congress, providing for the establishment of a first-class steamship line between San Francisco and Australia, which is the only link now wanting to perfect the chain of through transit.

"Impressed with the importance of perfecting arrangements, at an early day, under which through transportation may be secured between the points hereinbefore referred to, we recommend the appointment of a committee by this association who shall represent the rail lines interested, and who will confer with the representatives of the steamship lines, and will establish through rates, and agree upon the necessary details."

The rest of the day was spent in a consultation concerning rates.

It had been generally supposed that the general managers of the trunk lines to New York would report to this meeting a new rate, on which the association would make divisions, but no announcement of the kind was made.

National Railway Publication Company.

Last Thursday morning at nine o'clock, just previous to the meeting of the General Ticket Agents' Association, there was a meeting of the above company, which is composed almost exclusively of ticket agents and publishers of the Official Railway Guide.

The report of the Board of Directors for the past six months was presented by the Chairman, Mr. H. W. Gwinner.

The report gave a detailed financial statement, which showed that the company was financially sound and prosperous, and that their publication was meeting with the success and patronage that was expected. The total number of authorized shares was 4,000, at a par value of $25, of which 2,230 had been subscribed for, and an assessment of 20 per cent. had been paid in on 1,870 shares, amounting to $9,350. There was due $2,100 on 420 shares subscribed for. Recent correspondence shows that nearly all these subscriptions would be taken up, leaving only 1,710 to be taken up, for all of which there had been applicants. The editor, Mr. Edward Vernon, had been working hard and well, and arrangements were to be made to give him an assistant.

The report was adopted, and parts of it referred to the following committees:

On Debt to Railroad Companies—L. M. Cole, C. E. Follett, B. W. Wrenn.

On Maps—G. A. Dadmun, A. V. H. Carpenter, W. H. King.

Illinois Central.

A telegram from Washington says that returns in the War Department which have lately been examined with reference to the transportation account of the late war, show that the portion of the service of the Illinois Central Railroad, which was rendered free under a provision of the bill granting lands for its construction, has amounted to a sum equal to $20 an acre to the government for the land it gave.

On and after Saturday, October 1st, the 11 o'clock p. m. train to Hyde Park will be discontinued. The night express train south will stop at Hyde Park, and commutation tickets to Hyde Park will be received on that train.

The Eighteenth street station is abolished. No trains will stop there after this date.

Chicago & Northwestern.

The Janesville *Gazette* proposes that the connection between the Wisconsin and Madison divisions which it has been proposed to make between Shopiere and Afton be made instead between Janesville and Evansville. The latter would be about sixteen miles long, the former about seven. The difference in expense the *Gazette* proposes that Janesville and Evansville make up to the company. Either route will make nearly an air line between Chicago and Madison.

From the Baraboo *Republic* we learn that Reedsburg has voted $20,000 as a stock subscription and $5,000 for right of way to the Madison & LaCrosse extension; Winfield $5,000 stock subscription; Excelsior $12,500 stock subscription and $2,500 for right of way, All the subscriptions asked between Madison and Reedsburg have been voted.

Rails are going down on the line of the Winona Eastern Connection between Winona & LaCrosse at each end of the route. It is to be completed by New Year's.

Michigan Central.

The company has recently received some new postal cars built at their shops in Detroit under the direction of J. B. Sutherland, its Master Car Builder, and one of the ablest in America. The Chicago *Evening Post* describes one of them as follows:

"The car now at the depot is 48 feet long, nine feet longer than these cars have been built heretofore. It is neatly painted on the exterior with a soft buff color, and appropriately lettered. The interior is finished in oak and oiled black walnut. Two-thirds of the space of the car is occupied with the letter and newspaper cases. In the former there are 430 boxes, and in the latter 60. These cases are arranged in a semi-circular shape, and have ample desks around them for "making-up" purposes. All the distributing and separating offices and the railroads in connection with the line have their boxes in the cases. Patent reflecting lamps are hung upon the cases and give ample light in connection with the two large lamps in the cupola roof. Ruttan's ventilators supply the car with fresh air. The bulkheads are neatly grained, and the ceiling elaborately frescoed. Two red velvet plush covered lounges are at hand to furnish the clerks with rest, and can be stowed away snugly under the cases. A 'through mail room' occupies the balance of the car. Here are put the mail bags after the mails are distributed. Off this room are closets for washing purposes. A patent 'mail catcher' is fastened to the doors leading out of the room. By this, mail bags can be taken from stations as the trains pass, a crane being erected at each depot for the purpose. The car is upon a six-wheeled truck, and has the Miller platform, coupler and buffer."

Personal.

Henry W. Hubbell, long conductor of the Aurora accommodation, and lately ticket agent of the Chicago, Burlington & Quincy Railroad at the Chicago depot, and who a short time ago was sick at Aurora with a pulmonary affection and not expected to live, has so far recovered as to be able to go to Colorado, where it is hoped that the pure air of the mountains will entirely restore his health.

Mr. S. R. Groves, a member of the British Parliament for Liverpool and a director of the London & Northwestern Railway, was in the city this week.

A report is current that Mr. E. B. Phillips, late of the Lake Shore & Michigan Southern Railway, has been offered a position as General Superintendent of the Union Pacific in place of C. G. Hammond. Another report is to the effect

that he will be offered the management of the Boston, Hartford & Erie road.

Drawn hither by the session of the General Ticket Agents' Association we find three representatives of the *Travelers' Official Railway Guide*—Mr. Edward Vernon, the founder and editor of this guide, to whose energy, perseverance and unremitting care it owes its existence, its excellence and its remarkable success; Mr. Green, of the Leisenring Printing House, the printers of the *Guide*, and Mr. I. D. Marks, its advertising agent.

An unusual number of Southern ticket agents are present at this session of the Association.

Chicago & Alton.

This company will have on exhibition at the St. Louis Fair one of the superlatively beautiful day passenger cars which it is building at its Bloomington shops, and with which it is equipping its road. These cars have Blackstone's platforms, six-wheel trucks with Grigg's steel tire, Creamer's safety brakes, are lighted with gas, and elegantly carpeted, upholstered and ornamented. They cost $12,000 each, and for comfort, safety and elegance are unsurpassed. This road has long been notable for the completeness and elegance of its equipment, and these new coaches show that it is bound to keep abreast of the age, and possibly a little ahead of it.

REGISTER OF EARNINGS.

FOR THE FIRST TWO WEEKS IN SEPTEMBER.

Des Moines Valley (244 miles), 1870	$42,061 70
" " (162 miles), 1869	36,851 55
Increase (14 per cent.)	$ 5,209 15
Central Pacific (890 miles), 1870	$423,335 00
Union Pacific (1,038 miles) 1870	$332,128 00

FOR THE SECOND WEEK IN SEPTEMBER.

Chicago & Northwestern (1,157 miles), 1869	$305,926 00
" " (1,157 miles), 1870	278,906 00
Decrease (9 per cent.)	$27,020 00
Chicago, Rock Island & Pacific (608 miles), 1870	$135,500 00
" " " (594 miles), 1869	130,954 00
Increase (3½ per cent.)	$4,546 00
Pacific of Missouri (355 miles), 1869	$87,650 00
" " (355 miles), 1870	82,984,00
Decrease (5½ per cent.)	$4,666 00
Toledo, Wabash & Western (522 miles), 1870	$103,739 00
" " " (522 miles), 1869	101,411 00
Increase (2¼ per cent.)	$2,328 00
Cleveland & Pittsburgh (203 miles) 1870	$60,821 26
" " (203 miles) 869	49,899 45
Increase (2 per cent.)	$10,921 81

FOR THE THIRD WEEK IN SEPTEMBER.

Michigan Central (404 miles), 1870	$102,769 93
" " (329 miles), 1869	101,706 64
Increase (1 per cent.)	$1,063 29
Milwaukee & St. Paul (936 miles), 1870	$184,660 60
" " (825 miles), 1869	168,649 00
Increase (9½ per cent)	$16,011 00
North Missouri (476 miles), 1870	$64,834 00
" " (404 miles), 1869	43,030 00
Increase (7⅜ per cent.)	$21,844 00
Chicago & Alton (431 miles) 1869	$136,642 35
" " (465 miles), 1870	126,152 17
Decrease (7⅝ per cent.)	$10,490 18

The Finishing and Decoration of Machinery.

Everybody prefers to look at beautiful things rather than at those unattractive in their appearance; but in things made not with a special design to be looked at and admired, but to be used, it has been questionable in the minds of many whether it is not better to avoid much attempt at decoration or ornamental design, both for the sake of cheapness in initial cost and the saving of subsequent labor to preserve the beauty of such articles when in actual use.

As usual there are extremists on both sides of this question, and the truth lies in a mean between the elaborate decoration which some would advocate, and the total neglect of adornment which would suit the views of others.

For ourselves, we are always gratified to see an elegant design and finish in a machine, even when it is employed to do rude work; but elegance of design does not always mean elaboration.

The question of fitness is one which should greatly influence all consideration of ornament. Nothing looks well out of place. A cluster of roses looks very pretty in the center of a panel of an enameled bedstead. On the blade of a barn-shovel such an ornament would be simply ridiculous. The cloth plate of a sewing machine may be highly decorated, and such decoration is in perfect good taste. Sewing machines are much used amid surroundings of beautiful objects. Beautiful textures are wrought upon them, and no incongruity results from ornamentation of such machines designed to be used in the household.

We confess that the hose carts now used by the fire departments of our principal cities, in connection with steam fire-engines, appear to us much more appropriate with their almost entire absence of ornamentation than the elaborately adorned ones formerly in vogue under the volunteer fire company system. Those now employed are made for service and not for show, and their fitness for the purpose to which they are applied is an element of comeliness, which more than compensates for the absence of gay colors and the glitter of polished metal.

It is because we deem elaborate ornament entirely out of place on locomotives that we regard the reform in this particular, now in progress on American roads, as a step in the right direction. Our sense of the fitness of things has always received a shock when we have seen a highly decorated locomotive dash besmirched and dingy into a railway depot. A "sweep could as appropriately put on a shirt of snow-white seventeen-hunder linen," in the preparation for the cleansing of a kitchen chimney, as a manufacturer of a locomotive could lavish thereon the ornate display we deprecate, which, besides being out of place, is an element of expense, and an entailment of increased labor in caring for the costly machine.

But while we find fault with extravagant and incongruous ornament, it will not do to ignore the fact that a machine appropriately decorated stands a much better chance of being well cared for than one totally destitute of attractiveness in appearance. The reflex effect of a beautiful design in a machine will unconsciously influence its attendants and beget in them increased neatness and care. So there is possibly a danger that in stripping locomotives of their inappropriate and elaborate finish, the other extreme may be adopted, and what would not only be appropriate but useful in its effects may be neglected.—*Scientific American.*

Speech at the Master Mechanics' Banquet.

At the banquet given by the manufacturers of Philadelphia to the master mechanics during their recent convention in Philadelphia the following address was made by the Chairman, Joseph Harrison, Jr.:

Fellow Railway Master Mechanics and Gentlemen:

Through the kindness of partial friends amongst those who have been most active in promoting the object that has brought us together to-night, the honor has devolved upon me of presiding at this board. A fitter man had been selected to fill the place I now occupy one more closely connected with the commencement and the development of the great railways of our State. But an all-wise Providence called him hence ere the time arrived for this most pleasant meeting. In turning to this portrait draped in black, I need but mention the name of Samuel V. Merrick.

A railway engineer myself, schooled in the practical operations of workshop and the road for a great portion of my life, I can not but feel flattered by the distinction that has been conferred upon me, in being permitted to stand here to welcome the Association of American Railway Master Mechanics. I know well the importance of the responsibilities of your calling. Having in your charge the safe and efficient working of a system which now binds the world in its iron embrace, I know from my own personal experience how it taxes brain and body to work this system well. It has, as you all know, no perfect working. Things unseen to any eye, beyond the reach of any supervision, but too frequently lead to instant destruction and to death; and in the main it is not fair to blame the management when such disasters occur. What a wonderful thing the railway is! What a wonderful thing the locomotive, so necessary for the world, and yet comparatively so new! There are those present here to-night who can remember with myself the opening of the Liverpool & Manchester railway, but a short forty years ago. Railways were then not new, but from the success achieved by the newly designed locomotive on this line, a new era in the movements of men and material commenced. It may not be known to all here that the prospective motive power of the Liverpool & Manchester Railway was not finally decided upon until the road was well nigh completed. The locomotive had its friends in Stephenson, Hawkshaw, Ericsson, and others. A plan for placing stationary engines at intervals along the line, to draw the trains by means of ropes and pulleys, had its supporters. Horses were looked to as a safe means to fall back upon when all else should fail; and a machine was even designed and, I think, built—with a number of horses placed therein, turning in a circle, after the manner of the old horse boats on the Delaware, ere steam took the lead in conveying people to Camden. But the first flash of the little Rocket, an engine of only four tons weight, changed all this, and the locomotive at once took the place, which it now holds as the great motor on land. What a revolution this machine has wrought! How indispensable it has become in peace and in war! How faithfully it worked for us in the hour of our country's peril need not here be told. And now, when

"Grim-visaged War"

shakes to their centers the two greatest powers of Continental Europe, it is the locomotive that has enabled King William to throw his legions and his war material so swiftly over the frontiers of France, and thus by quick, redoubled blows, he has hurled his enemy back in defeat and dismay upon the capital, taking captive an Emperor, and wrecking a dynasty which but two months since seemed firmly fixed upon a throne. But enough of war. I prefer more peaceful themes.

I happened to be in England in 1851, when the census of the kingdom was taken. To get at a true result, it was made compulsory on every house-holder to fill up a form, giving all the particulars of every individual who had slept under his roof on a certain night in the month of March. For further accuracy, it became necessary to know how many persons were out of bed and traveling on that night on the railways of the kingdom. If my memory does not deceive me, the number of travelers reached to forty thousand—the population of a good-sized city. On our forty or fifty thousand miles of railway you can, in some sort, estimate the number of travelers who, at this very hour, are careering over our land. You can imagine, too, how many strained eyes are even now peering out into the darkness, as far as the headlight of the locomotive throws a gleam, eager to catch the first gleam of danger.

And here, my friends, let me say a word for the fearless men who manage our locomotives. Let them have the meed of honor they so justly deserve. Why, a man must be a hero who is willing to face the danger of running an engine forty miles an hour on a pitch dark night. The safety of these brave and faithful men, and the safety of these thousands of weary travelers, is in a very great degree confided to the keeping of the railway master mechanic.

It is for him to see that the moving machinery of the road shall not betray its trust from any lack of care on the part of himself or his assistants. It is a fearful responsibility that rests upon him when it is considered that the lives of thousands of the traveling public depend upon the soundness and good condition of a wheel or an axle, a bolt or a coupling, or even the need of a few drops of oil. My fellow railway master mechanics, yours is a calling as indispensable as it is honorable; and it is well that you meet in annual convention as you meet now. It is well that you should thus come together, and be better known to each other, so that you can the more readily compare notes and devise better plans for the security of life and property; seeking, in all things, such a near approach to perfection in the working of our great railway system as will render accident and disaster almost impossible. This is your great mission. May you leave nothing undone that will hinder its fulfilment.

Electric Telegraphs in Warfare.

A correspondent of the London *Times* gives the following description of the German organization of the military telegraph service, and the mode in which the telegraphs are conducted during actual hostilities

"The telegraph system attached to our army is composed in the following way. To understand it completely, it must be recollected, however, that an army is composed of various Corps d'Armee, and each corps of two divisions, therefore the telegraph is divided into three sections—1, the station at the Commander-in-Chief's; 2, the station at each corps; 3, the station at each division. Sending a message from a division of this army, to London we will say, it first goes to the station of the corps to which the division belongs, thence to the headquarters of the army to which the corps belongs, and thence to the nearest main line. Each section has one inspector and five secretaries, or what we should call clerks, four carriages, two smaller ones, and six wagons. The first named contain the cable, the second the apparatus and batteries, and the last named the posts upon which the wires are fixed. They carry twenty English miles of cable, and the average time it takes to lay it is three hours to every four miles. The process of laying is naturally the most scientific part of the arrangement, and is conducted in the following manner: An intelligent officer from the army, with some assistant under him, is entrusted with the general supervision of the telegraph of each army, and to him is entrusted the task of directing where the main line shall run. He rides on ahead of the wagons, which proceed at a footpace, the cable being passed out over a wheel, and indicates to the drivers by means of a piece of paper stuck on a stick or a blazed tree the direction they shall follow. In the meantime, the footsoldiers attached to the telegraph, who are selected from the regiments for superior intelligence, and wear a different uniform, with a large T on the shoulder-strap, are divided into what is called troops, or, in navvy language, 'gangs,' of three men each. The first take the wire, as it is payed out, lay it on the ground, and on it a post every 100 yards; the second coming after them twist the cable round the insulator, which is made of gutta percha, not glass, as we are in the habit of using, and erect the posts in the ground. This is a matter of great ease, they being about 12 feet high, and about the thickness of the butt-end of a salmon rod, slightly tapering towards the top. The third troop strain the wire, and ascertain that it is all clear of all wood, etc., and, in short, 'runs clear.' I should mention that whenever it is possible the trees are used as telegraph posts, and, by means of a light ladder, are easily ascended to the requisite heighth. It is altogether as perfect an arrangement as can be found. They all, however, complain that this war has tried them terribly, as, from the utter break-up of the railways by the retreating army, enormous distances have to be traversed before they can touch a main line. I forgot to mention that if necessary, and, in fact, always when on the field of battle, the telegraph is worked by a machine fixed inside one of the carriages. When, however, a house is obtainable, a room is instantly turned into an office."

Chicago, Pekin & Southwestern.

Pierce, Clark & Sharp, the contractors for the construction of this road, have commenced grading at Pekin on a short section which will complete the roadbed between Marseilles and Pekin. They have also commenced work on the division north of Marseilles in Nettle Creek and Lisbon townships, and expect next week to put on a force in Plainfield and Na-au-say, Will county, and in Poor Springs, Dupage county, on the line to Fremont, Cook county, and hope to have the whole line in operation within a year.

PUBLISHER'S ANNOUNCEMENTS.

—The London & Northwestern Railway Company, which has about 1,400 miles of track, in the two years 1868 and 1869 paid as compensation for accidents more than $820,000.

WANTS.

☞ SHORT ADVERTISEMENTS will be inserted under this head at ten cents per line for the first insertion, and five cents per line for each subsequent insertion.

WANTED Every Railway Traveler in the United States and the Dominion of Canada wants every railway company to use the Thomas Safety Baggage Check. It is in use on over sixty of the best managed roads in the country and has been during the past three years, and not one piece of baggage to which this check has been attached has been lost or miscarried. Every railroad man upon whose road it is in use says:

"*We are fully satisfied after a thorough trial and practical use of the Thomas Safety Baggage Check that both for local and through business it has no equal. It is cheaper, more satisfactory and better adapted to the business than any other check in use.*"

All information in reference to the Thomas Safety Baggage Check will be given by addressing G. F. THOMAS, editor Appleton's Railway Guide, 90, 92 and 94 Grand Street, New York.

WANTED—By a young CIVIL ENGINEER of four years' experience in the field, a position to take charge of a party or a Division on construction; or would run a transit or level. Apply to "D. F.," this office.

A CIVIL ENGINEER, who is thoroughly educated in his profession, has had experience in field work for some years, and is especially familiar with leveling and transit surveying, desires an engagement on a railroad. Address, TRANSIT, at the office of the RAILROAD GAZETTE.

WANTED —By a practical steam fitter and engineer of considerable experience, a situation to run a stationary engine or as locomotive fireman. Inquire at this office.

WANTED—A Civil Engineer of considerable experience in this and the Old Country is open for an engagement as Divisional Engineer, or in any business connected with Surveying—unquestionable references. Address CIVIL ENGINEER, care of Editor RAILROAD GAZETTE.

NOTICE TO CONTRACTORS.

OFFICE OF THE OHIO & MICH. R'Y CO.,
COLDWATER, Mich., Sept. 26, 1870.

Proposals will be received at this office until October 17, 1870, for the clearing, grubbing, grading, tieing and bridging of that portion of the line of the Ohio & Michigan Railway extending from the State Line, in the township of Amboy, through the counties of Hillsdale, Branch, Calhoun, Kalamazoo, and to the village of Allegan, in Allegan county, a distance of 95 miles

Proposals may be made for one or more sections, or for the whole work.

Proposals will state the proportion of cash, and of Capital Stock of the Company, which will be received for the work.

Plans and specifications will be exhibited at this office on and after the 1st of October next.

The Company reserve the right to reject any or all bids, or to accept such only as may seem to the Directors to be for the best interest of the stockholders.

Sealed proposals to be addressed to JOHN S. YOUNGS, Secretary.

By order of the Board of Directors.
HENRY C. LEWIS, President.

ESTABLISHED 1820.

WM. J. YOUNG & SONS,

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The Best Bankers' Safe

IN THE WORLD,

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The above Bankers' Safes are lined with the Crystalized (or Franklinite) Iron—the only metal which cannot be drilled by a Burglar.

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Employing none but the best workmen, and having superior facilities, I am prepared to do the best work (using the best materials) at low figures, and guarantee satisfaction. Patent Office Models a specialty.

RUFUS BLANCHARD,

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Has Issued a NEW STYLE of

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IN FLEXIBLE CASES,

Which are both cheap and convenient. The following States are now ready: Illinois, Iowa, Missouri, Kansas, Nebraska, Minnesota, Wisconsin, Indiana, Michigan and Ohio. Mailable on receipt of 25 cents. They show the counties, towns and railroads and are fine specimens of workmanship.

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M. BAIRD & CO., Philadelphia,

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ESPECIALLY ADAPTED TO EVERY VARIETY OF RAILROAD SERVICE,

— AND TO —

The Economical Use of Wood, Coke, Bituminous and Anthracite Coal as Fuel.

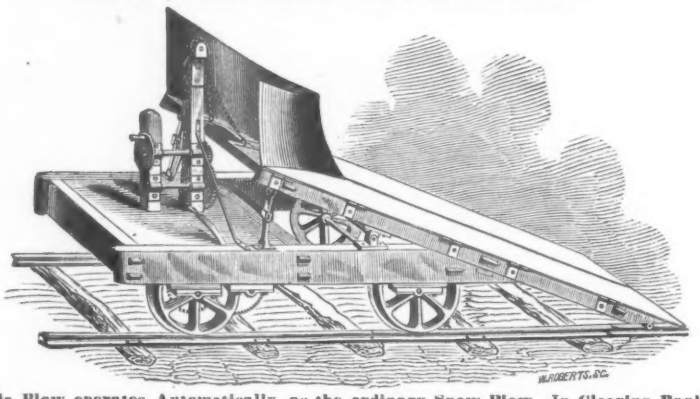
ALL WORK ACCURATELY FITTED TO GAUGES, AND THOROUGHLY INTERCHANGEABLE.

Plan, Materials, Workmanship, Finish and Efficiency, Fully Guaranteed.

M. BAIRD. CHAS. T. PARRY. WM. P. HENSZEY.
GEO. BURNHAM. EDW'D H. WILLIAMS. EDW'D LONGSTRETH.

Shaw's Patent Snow Plow!

RAPID, RELIABLE AND EFFECTIVE!



This Plow operates Automatically, as the ordinary Snow Plow. In Clearing Banks of Snow from the Track, it does more Rapid and Effective Work than can be done by any other Machine or Method.

THOMAS L. SHAW,
Omaha, Nebraska.

Car Plushes.

WE INVITE the attention of Railroad Companies and Car Builders to our extensive assortment of PLUSHES recently imported from France, and which we are offering at OLD PRICES, notwithstanding the present European complications, which have generally caused a material advance in this description of goods.

L. G. TILLOTSON & CO.,
No. 8 Dey St., New York,
Dealers in Railway Supplies of every description.

J. E. FRENCH. W. S. DODGE. D. W. CROSS.

Winslow Car Roofing Company.

PATENT IRON CAR ROOFS.

Established, 1859.

No. 211 Superior St. CLEVELAND, O.

Over 20,000 Cars covered with this Roof! We claim that these Roofs will keep Cars dry, and will last as long as the Cars they cover without any extra expense after once put on.

☞ SEND FOR CIRCULARS.

MOWRY

Car & Wheel Works,

MANUFACTURERS OF

Railroad Cars, Wheels and Axles, Chilled Tires,

AND ALL DESCRIPTIONS OF

Engine, Car, and Bridge Castings, of any Pattern

Wheels of all sizes constantly on Hand.

A. L. MOWRY, President, NEW YORK CITY. N. G. GREEN, Treas. and Supt., CINCINNATI, OHIO.

OFFICES: No. 80 Broadway, New York; No. 69 West 3d Street, Cincinnati, Ohio.
WORKS: Cor. Lewis and East Front Streets, Cincinnati, Ohio.

CHICAGO, ROCK ISLAND & PACIFIC RAILROAD.

☞ THE DIRECT ROUTE FOR ☜

JOLIET, MORRIS, OTTAWA, LASALLE, PERU, HENRY, PEORIA,

Lacon, Geneseo, Moline,

ROCK ISLAND, DAVENPORT,

Muscatine, Washington, Iowa City,

GRINNELL, NEWTON, DES MOINES,

COUNCIL BLUFFS & OMAHA!

Connecting with Trains on the Union Pacific Railroad, for

Cheyenne, Denver, Central City, Ogden, Salt Lake, White Pine, Helena, Sacramento, San Francisco,

And Points in Upper and Lower California; and with Ocean Steamers at San Francisco, for all Points in **China, Japan, Sandwich Islands, Oregon and Alaska.**

☞ TRAINS LEAVE their Splendid new Depot, on VanBuren Street, Chicago, as follows:

	LEAVE.	ARRIVE.
PACIFIC EXPRESS. (Sunday excepted)	10.00 a. m.	3.35 p. m
PERU ACCOMMODATION. (Sundays excepted)	5.00 p. m.	9.50 a. m
PACIFIC EXPRESS, (Saturdays excepted,)	10.00 p. m.	[Mon. ex. 6.00 a. m

ELEGANT PALACE SLEEPING COACHES!

Run Through to Peoria and Council Bluffs, Without Change.

☞ Connections at La SALLE, with Illinois Central Railroad, North and South; at PEORIA, with Peoria, Pekin & Jacksonville Railroad, for Pekin, Virginia, &c.; at PORT BYRON JUNCTION, for Hampton, LeClaire, and Port Byron; at ROCK ISLAND, with Packets North and South on the Mississippi River.

☞ **For Through Tickets,** and all desired information in regard to Rates, Routes, etc., call at the Company's Offices, No. **37** South Clark Street, Chicago, **413** California Street, San Francisco, or **257** Broadway, New York.

A. M. SMITH, Gen. Pass. Agent. HUGH RIDDLE, Gen. Supt. P. A. HALL, Asst. Gen. Supt.

Leavenworth, Lawrence,

— AND —

GALVESTON R. R. LINE,

OF KANSAS.

Two Distinct Lines of Road from Kansas City, Mo., and Lawrence, Kan.,

Uniting at OTTAWA, and from thence as a Trunk Line to

INDIAN TERRITORY.

The SHORTEST and ONLY DIRECT ROUTE to the celebrated Neosho and Verdigris Valleys of Kansas, and will be opened for business to the Border of Indian Territory, by Nov. 1st, 1870.

☞ **FIVE DAILY TRAINS, Each Way,** connecting at LAWRENCE with trains the KANSAS PACIFIC ROAD, for WEST and NORTH and at KANSAS CITY with ALL ROADS FOR THE EAST and NORTH, at end of Track with Kansas Stage Co.'s Line of Coaches for all parts of

INDIAN TERRITORY, TEXAS & NEW MEXICO.

☞ **Ask for Tickets via L. L. & G. R. R.,** for all points in Southern Kansas. Freight taken from any part of the East to end of track WITHOUT BREAKING BULK.

CHAS. B. PECK, Gen. Freight and Ticket Agent, Lawrence, Kan.

M. R. BALDWIN, Superintendent, Lawrence, Kan.

The Great Favorite Route for Missouri, Nebraska and Iowa.

KANSAS CITY, ST. JOSEPH

— AND —

COUNCIL BLUFFS

☞ **THROUGH LINE!** ☜

3 EXPRESS PASSENGER TRAINS Leave Union Depot Daily, on the arrival of Eastern Southern and Western Trains, crossing the Missouri River on the New Iron Bridge at Kansas City, passing the cities of

LEAVENWORTH, ATCHISON, SAINT JOSEPH,

— AND —

NEBRASKA CITY.

Connecting at COUNCIL BLUFFS with Iowa Lines for all prominent points in Iowa, and making DIRECT CONNECTION at **OMAHA** with the Great **Union Pacific Railroad,** for

CHEYENNE, DENVER, SALT LAKE, SACRAMENTO, SAN FRANCISCO, And the Pacific Coast.

Pullman's Palace Sleeping Cars!

ON ALL NIGHT TRAINS.

☞ Ask for Tickets via the People's Favorite Route, **Kansas City, St. Joseph & Council Bluffs Railroad Line.**

A. L. HOPKINS, Gen Superintendent, ST. JOSEPH, Mo.

A. C. DAWES, Gen. Passenger Agent, ST JOSEPH, Mo.

Milwaukee & St. Paul R. W.

THE ONLY ALL RAIL LINE TO

ST. PAUL AND MINNEAPOLIS!

AND ALL PORTIONS OF

Wisconsin, Minnesota & Northern Iowa.

PURCHASE TICKETS VIA MILWAUKEE.

Passengers Going via Milwaukee,

Have Choice of Seats in Clean Coaches, and on Night Trains, a full night's rest in Palace Sleeping Cars.

☞ BAGGAGE CHECKED THROUGH BY THIS ROUTE ONLY! ☜

PASSENGERS FROM CHICAGO can obtain these Advantages only by the MILWAUKEE DIVISION of the CHICAGO & NORTHWESTERN R'Y.

SPECIAL NOTICE.—Passengers destined to any place in Wisconsin, Minnesota, or Northern Iowa, either on or off the Lines of this Company, who cannot procure Through Tickets to their destination, should purchase their Tickets **TO MILWAUKEE,** as this is the Great Distributing Point for these States.

A. V. H. CARPENTER, Gen. Pass. Agt. Milwaukee.

S. S. MERRILL, Gen. Manager, Milwaukee.

KANSAS PACIFIC RAILWAY.

Great Smoky Hill Route,

Now Completed and Open for Business Through to

DENVER, COLORADO,

There Connecting with the DENVER PACIFIC RAILROAD for CHEYENNE, forming, in Connection with the UNION and CENTRAL PACIFIC RAILROADS, another ALL-RAIL ROUTE to

CALIFORNIA, NEVADA, UTAH, MONTANA,

WYOMING, COLORADO, &C.

The most available Passenger and Freight Route to Lawrence, Topeka, Junction City, Abilene, Salina, Hays, KIT CARSON, River Bend, DENVER, CHEYENNE, OGDEN, SALT LAKE CITY,

Sacramento, and San Francisco.

☞ Close Connections are made in Union Depots at KANSAS CITY and STATE LINE with Express Trains of the Hannibal & St. Joseph, North Missouri and Missouri Pacific Railroads.

Southern Overland Passenger and Mail Coaches leave Kit Carson daily for Pueblo, Trinidad, Fort Union, Santa Fe, &c.

Hughes & Co.'s Splendid Concord Coaches leave Denver daily for Central City, Georgetown, &c.

Passenger and Freight Rates always as low and conveniences as ample as by any other Route.

PULLMAN'S PALACE CARS ACCOMPANY NIGHT EXPRESS TRAINS.

Through Tickets can be obtained at all principal ticket offices. Be careful to ask for tickets via Kansas Pacific Railway, "Smoky Hill Route."

5,000,000 Acres of Farming Lands For Sale!

Situated along the line of this Great National Railway. For particulars, address JNO. P. DEVEREUX, Land Commissioner, Lawrence, Kansas.

R. B. GEMMELL, Gen. Freight & Ticket Agt. A. ANDERSON, Gen. Supt.

THE ERIE & PACIFIC DISPATCH CO.

Are Authorized Freight Agents.

For information, Contracts, and Bills of Lading, apply at their office, 64 Clark Street, Chicago.

H. H. RAPP, AGT.

MARSH & GOODRIDGE.
256 So. WATER St. CHICAGO.

Dealers in

R. R. Cross-Ties, Telegraph Poles,

FENCE POSTS, BRIDGE TIMBER,

Piles, Hard-wood Plank, &c., &c.,

To which the Attention of Railroad Contractors and Purchasing Agents is respectfully called.

REFER TO:—Jas. M. Walker, Chicago, Pres't L. L. & G. R. R.; Jas. E. & Wm. Young, Chicago, Railroad Builders; H. J. Higgins, Purchasing Agent C. B. & Q. R. R.; and Railroad Officers and Purchasing Agents generally.

MARSH & GOODRIDGE,

256 South Water St., Chicago.

CHICAGO & NORTHWESTERN R. W.

Comprising the PRINCIPAL RAILROADS from CHICAGO Directly NORTH NORTH-WEST and WEST.

ALL RAIL TO THE PACIFIC OCEAN!

Great California Line.

TRAINS LEAVE WELLS STREET DEPOT AS FOLLOWS:

8:15 A. M. Cedar Rapids Pass	9:15 P. M. Night Mail.
10:30 A. M. Pacific Express.	9:15 P. M. Rock Island Pass.
10:30 A. M. Rock Island Exp.	4:00 P. M. Dixon Passenger.

For Sterling, Rock Island, Fulton, Clinton, Cedar Rapids, Boone, Denison, Missouri Valley Junction, Sioux City, Council Bluffs and Omaha, there connecting with the

UNION PACIFIC R. R.

For Cheyenne, Denver, Ogden, Salt Lake, the White Pine Silver Mines, Sacramento, San Francisco, and all parts of Nebraska, Colorado, New Mexico, Arizona, Wyoming, Montana, Idaho, Utah, Nevada, and the PACIFIC COAST.

FROM CHICAGO	Hours.	1st Class Fare.	FROM CHICAGO	Days.	1st Class Fare.
To OMAHA,.....	23	$20.00	To SACRAMENTO,.	4½	$118.00
" DENVER,.....	52	70.75	" SAN FRANCISCO,	5	118.00

TRAINS ARRIVE:—Night Mail, 7.00 a. m.; Dixon Passenger, 11.10 a. m.; Pacific Express, 3:50 p. m.; Rock Island Express, 3:50 p. m.; Cedar Rapids Passenger, 6:50 p. m.

FREEPORT LINE.

9.00 A. M. & 9.45 P. M. For Belvidere, Rockford, Freeport, Galena, Dunleith, and St. Paul.

4.00 P. M., Rockford Accommodation.
5.30 P. M., Geneva and Elgin Accommodation
6.10 P. M., Lombard Accommodation.
5:50 P. M., Junction Passenger.

TRAINS ARRIVE:—Freeport Passenger, 2:30 a. m., 3:00 p. m.; Rockford Accommodation, 11:10 a. m.; Geneva and Elgin Accommodation, 8:45 a. m.; Junction Passenger, 8:10 a. m.; Lombard Accommodation, 6:50 a. m.

WISCONSIN DIVISION.

☞ Trains leave Depot, cor. West Water and Kinzie Sts., daily, Sundays excepted, as follows:

10.00 A. M. **DAY EXPRESS,** for Janesville, Monroe, Whitewater, Madison, Prairie du Chien, Watertown, Minnesota Junction, Portage City, Sparta, La Crosse, St. Paul, and ALL POINTS ON THE UPPER MISSISSIPPI RIVER; Ripon, Berlin, Fond du Lac, Oshkosh, Neenah, Appleton, and Green Bay.

3.00 P. M., Janesville Accommodation.

5.00 P. M. **NIGHT EXPRESS,** for Madison, Prairie du Chien, Watertown, Minnesota Junction, Portage City, Sparta, La Crosse, St. Paul, and ALL POINTS ON THE UPPER MISSISSIPPI RIVER; Ripon, Berlin, Fond du Lac, Oshkosh, Menasha, Appleton, Green Bay, and THE LAKE SUPERIOR COUNTRY.

5.30 P. M., Woodstock Accommodation.
6:20 P. M., Barrington Passenger.

TRAINS ARRIVE:—5:30 a. m., 7:45 a. m., 10:10 a. m., 1:00 p. m. and 7:15 p. m.

MILWAUKEE DIVISION.

MILWAUKEE MAIL,.....	8:00 A. M.
EXPRESS, (ex. Sun.) Waukegan, Kenosha, Racine and Milwaukee,.....	9:45 A. M. 5:00 P. M.
EVANSTON PASSENGER,.....	11:40 A. M.
HIGHLAND PARK PASSENGER,.....	1:15 P. M.
MILWAUKEE ACCOMMODATION, with Sleeping Car attached.....	11:00 P. M.
EVANSTON ACCOMMODATION, (Daily,) from Wisconsin Div. Depot.....	1:30 P. M.
KENOSHA ACCOMMODATION, (Sundays excepted) from Wells St. Depot.....	4:15 P. M.
AFTERNOON PASSENGER, from Milwaukee Div. Depot.....	5:00 P. M.
WAUKEGAN ACCOMMODATION, (except Sundays) from Wells St. Depot.....	5:25 P. M.
WAUKEGAN PASSENGER, (Sundays excepted) from Wells St. Depot.....	6:15 P. M.

TRAINS ARRIVE:—Night Accommodation, with Sleeping Car, 5:00 a. m.; Day Express, 4:10 p. m. Milwaukee Mail, 10:10 a. m.; Afternoon Passenger, 8:00 p. m.; Waukegan Accommodation, 8:25 a. m.; Kenosha Accommodation, 9:10 a.m.; Evanston Accommodations, 1.40 and 4.00 p. m.; Waukegan Passenger, 7:55 a. m.; Highland Park Passenger, 3.45 p. m.

PULLMAN PALACE CARS ON ALL NIGHT TRAINS.

THROUGH TICKETS Can be purchased at all principal Railroad Offices East and South, and in Chicago at the Southeast corner of Lake and Clark Streets, and at the Passenger Stations as above.

H. P. STANWOOD, Gen. Ticket Agt.
GEO. L. DUNLAP, Gen'l Supt.

Western Union Railroad.

CHICAGO & NORTHWESTERN DEPOT, CHICAGO. | MILWAUKEE & CHICAGO DEPOT, MILWAUKEE.

THE DIRECT ROUTE!

CHICAGO, RACINE & MILWAUKEE,

— TO —

Beloit, Savanna, Clinton, Pt. Byron, Davenport, Mineral Point, Madison, Freeport, Fulton, Lyons, Rock Island, Sabula, Galena, Dubuque, Des Moines, Council Bluffs,

OMAHA, SAN FRANCISCO

AND ALL PRINCIPAL POINTS IN

Southern and Central Wisconsin, Northern Illinois, and Central and Northern Iowa.

FRED. WILD, Gen. Ticket Agent.
D. A. OLIN, Gen. Superintendent.

CRERAR, ADAMS & CO.,

MANUFACTURERS AND DEALERS IN

Railroad Supplies!

—AND—

CONTRACTORS' MATERIAL.

11 and 13 Wells Street,

CHICAGO, ILL.

Manufacturers of IMPROVED HEAD-LIGHTS for Locomotives, Hand and Signal Lanterns, Car and Station Lamps, Brass Dome Casings, Dome Mouldings, Cylinder Heads, and Car Trimmings, of Every Description

Pan-Handle

— AND —

Penn'a Central Route East!

☞ SHORTEST AND QUICKEST ROUTE, VIA COLUMBUS, TO ☜

PITTSBURGH, BALTIMORE, PHILADELPHIA & NEW YORK

On and after Saturday, JULY 10th, 1870, Trains for the East will run as follows:

[DEPOT CORNER CANAL AND KINZIE STS., WEST SIDE.]

8:10 A. M. DAY EXPRESS. [SUNDAYS EXCEPTED.] Via Richmond. Arriving at

COLUMBUS ...	2:35 A. M.	HARRISBURG..	10:35 P. M.	NEW YORK....	6:40 A. M.	WASHINGTON..	5:50 A. M.
PITTSBURGH..	12:00 M.	PHILADELPHIA	3:10 A. M.	BALTIMORE...	2:30 A. M.	BOSTON.....	5:05 P. M.

7:40 P. M. NIGHT EXPRESS. [SATURDAYS EXCEPTED.] Arriving at:

COLUMBUS..	11:15 A. M.	HARRISBURG..	5:10 A. M	NEW YORK...	12:10 P. M.	WASHINGTON.	1:10 P. M
PITTSBURGH..	7:05 P. M.	PHILADELPHIA.	9.35 A. M.	BALTIMORE...	9:00 A. M.	BOSTON.....	11:50 P. M

Palace Day and Sleeping Cars

Run Through to COLUMBUS, and from Columbus to NEW YORK, WITHOUT CHANGE!

ONLY ONE CHANGE TO NEW YORK, PHILADELPHIA, OR BALTIMORE!

CINCINNATI & LOUISVILLE AIR LINE SOUTH.

35 Miles the Shortest Route to Cincinnati,
18 Miles the Shortest Route to Indianapolis and Louisville.

2 Hours the Quickest Route to Cincinnati!

THE SHORTEST AND BEST ROUTE TO

Columbus, Chillicothe, Hamilton, Wheeling, Parkersburg, Evansville, Dayton, Zanesville, Marietta, Lexington, Terre Haute, Nashville,

ALL POINTS IN CENTRAL & SOUTHERN OHIO, & INDIANA, KENTUCKY & VIRGINIA.

— QUICK, DIRECT AND ONLY ALL RAIL ROUTE TO —

New Orleans, Memphis, Mobile, Vicksburg, Charleston, Savannah,

AND ALL POINTS SOUTH.

Cincinnati, Indianapolis and Louisville Trains run as follows:

THROUGH WITHOUT CHANGE OF CARS!

8:10 A. M. (Sundays excepted) Arriving at

LOGANSPORT.....	1:15 P. M.
KOKOMO.....	2:33 P. M.
CINCINNATI.....	9:30 P. M.
INDIANAPOLIS	5:00 P. M.
LOUISVILLE.....	11:30 P. M.

7:40 P. M. (Saturdays excepted.) Arriving at

LOGANSPORT...	1:30 A. M.
KOKOMO.....	2:45 A. M.
CINCINNATI.....	10:30 A. M.
INDIANAPOLIS.....	5:40 A. M.
LOUISVILLE.....	3:50 P. M.

Lansing Accommodation: Leaves 5:10 P. M. Arrives 8:55 A. M.

PULLMAN'S PALACE SLEEPING CARS!

Accompany all Night Trains between Chicago and Cincinnati or Indianapolis.

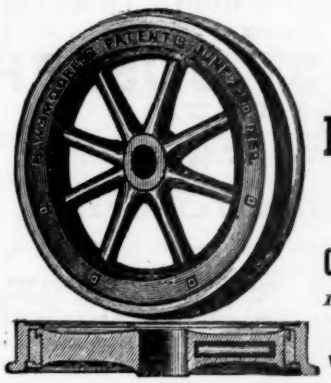
☞ Ask for Tickets **via COLUMBUS** for the East, and **via "The AIR LINE"** for Cincinnati, Indianapolis, Louisville and points South. Tickets for sale and Sleeping Car Berths secured at **95 RANDOLPH STREET, CHICAGO,** and at Principal Ticket Offices in the West and Northwest.

WM. L. O'BRIEN, Gen. Pass. and Ticket Agent, Columbus.
I. S. HODSDON, Northwestern Pass. Agt., Chicago.

D. W. CALDWELL Gen Supt. Columbus.

MOORE Steel Elastic Car Wheel Co.

OF NEW JERSEY.



Proprietors of

MOORE'S PATENT

FOR THE MANUFACTURE OF

ELASTIC CAR WHEELS

FOR PASSENGER AND SLEEPING COACHES.

Noiseless, Safe, Durable and Economical.

Also, Manufacturers of

CAR WHEELS OF EVERY DESC IPTION.

H. W. MOORE, President.
JAS. K. FROTHINGHAM, Secretary.
F. W. BLOODGOOD, Treasurer

Works, cor. Green and Wayne Sts., JERSEY CITY, N. J
P. O. Address—Box 129, Jersey City, N. J.

American Compound Telegraph Wire.

More than 3000 Miles now in Operation,

Demonstrating beyond question its superior working capacity, and great ability to withstand the elements. For RAILROAD LINES, connecting a single wire with a large number of Stations, and for long circuits, this wire is peculiarly adapted; the large conducting capacity secured by the copper, with other advantages, rendering such lines fully serviceable during the heaviest rains.

Having a core of steel, a small number of poles only are required, as compared with iron wire construction, thereby preventing much loss of the current from escape and very materially reducing cost of maintenance OFFICE AMERICAN COMPOUND TELEGRAPH WIRE CO.
234 West 29th Street, New York.

BLISS, TILLOTSON & CO., Western Agents.
247 South Water Street, Chicago.

THE FAVORITE THROUGH PASSENGER ROUTE!

Chicago, Burlington & Quincy
RAILROAD LINE.

3 THROUGH EXPRESS TRAINS DAILY!

FROM CHICAGO	Hours.	1st Class Fare.	FROM CHICAGO	Days.	1st Class Fare.
TO OMAHA, - - -	23	$20.00	TO DENVER, - -	2¼	$68.70
" ST. JOSEPH, - -	21	19.50	" SACRAMENTO, -	4½	118.00
" KANSAS CITY, -	22	20.00	" SAN FRANCISCO,	5	118 00

Trains Leave Chicago from the Great Central Depot, foot of Lake Street, as follows:

BURLINGTON, KEOKUK, COUNCIL BLUFFS & OMAHA LINE.

7:40 A. M. MAIL AND EXPRESS, (Except Sunday,) stopping at all stations; making close connections at Mendota with Illinois Central for Amboy, Dixon, Freeport, Galena, Dunleith, Dubuque, LaSalle, El Paso, Bloomington, &c.

10:45 A. M. PACIFIC FAST LINE, (Except Sunday,) stopping at Riverside, Hinsdale, Aurora, Leland, Mendota, Princeton, Buda, Kewanee, Galva, Galesburg, and all Stations West and South of Galesburg.
☞ An ELEGANT DAY COACH and a PULLMAN PALACE DRAWING ROOM CAR is attached to this train daily from Chicago

TO COUNCIL BLUFFS & OMAHA WITHOUT CHANGE!

5.00 P. M. EVENING EXPRESS, (Daily, except Sunday), in direct connection with the celebrated New York and Chicago Lightning Express Trains of all Eastern Lines, for Burlington, Ottumwa, Des Moines, Nebraska City, Council Bluffs, Omaha, and all points West. Pullman Drawing-Room Sleeping Car attached to this Train daily from Chicago to Ottumwa without change!

11:30 P. M. NIGHT EXPRESS, (Daily, except Saturday,) stopping at all principal stations between Chicago and Burlington. ELEGANT DAY COACHES, and a PULLMAN PALACE SLEEPING CAR are attached to this train from Chicago to Burlington, without change! This is the only Route between

CHICAGO, COUNCIL BLUFFS & OMAHA,

— RUNNING THE CELEBRATED —

Pullman Palace Dining Cars!

49 MILES THE SHORTEST R UTE BETWEEN

Chicago & Keokuk,

And the Only Route Without Ferrying the Mississippi River!

QUINCY, ST. JOSEPH, LEAVENW'TH & KANSAS CITY LINE.

10:45 A. M. PACIFIC EXPRESS, (Daily, except Sunday,) with an Elegant Day Coach and one of PULLMAN'S PALACE SLEEPING CARS attached, running through from Chicago to KANSAS CITY, Without Change!

5:00 P. M. EVENING EXPRESS, (Daily, except Sunday,) with Pullman Palace Drawing Room Sleeping Car attached, running through from Chicago to QUINCY, Without Change!

11:30 P. M. NIGHT EXPRESS (Daily, except Saturday,) with Pullman Palace Sleeping Car attached from Chicago to GALESBURG: Palace Day Coaches from Chicago to QUINCY, Without Change!

64 MILES THE SHORTEST AND ONLY ROUTE BETWEEN

Chicago and Kansas City!

WITHOUT CHANGE OF CARS OR FERRY.

115 MILES The Shortest Route bet. Chicago & St. Joseph.

THE SHORTEST, BEST AND QUICKEST ROUTE BETWEEN CHICAGO AND

Atchison, Weston, Leavenworth, Lawrence,

AND ALL POINTS ON THE KANSAS PACIFIC R'Y.

Local Trains Leave { RIVERSIDE & HINSDALE ACCOMMODATION.7:00 A. M. 1:30 & 6:15 P. M.
MENDOTA PASSENGER.....4:15 P. M.
AURORA PASSENGER.....5:30 P. M.

Trains Arrive:—Mail and Express, 3:45 p. m; Atlantic Exp, 4:15 p. m, except Sunday; Night Exp, 9:05 a. m., except Monday; Mendota Passenger, 10:00 a. m.; Aurora Passenger, 8:15 a. m.; Quincy Passenger 7:30 P. M; Riverside and Hinsdale Accommodation, 6:50 and 9 a. m and 5:30 p. m, except Sunday.

Ask for Tickets via Chicago, Burlington & Quincy Railroad, which can be obtained at all principal offices of connecting roads, and at Company's office in Great Central Depot, Chicago, at as low rates as by any other route.

ROB'T HARRIS, Gen'l Superintendent, CHICAGO.
SAM'L POWELL, Gen'l Ticket Agent, CHICAGO.
E. A. PARKER, Gen. West. Pass. Agt., CHICAGO

THE GREAT THROUGH PASSENGER ROUTE TO KANSAS

IS VIA THE OLD RELIABLE

HANNIBAL & ST. JOSEPH
SHORT LINE.

Crossing the Mississippi at Quincy and the Missouri at Kansas City on New Iron Bridges; running Three Daily Express Trains, Through Cars and Pullman Sleeping Palaces from Chicago & Quincy to St. Joseph & Kansas City.

The Advantages gained by this Line over any other Route from Chicago, are:

115 MILES THE SHORTEST!

To St. Joseph, Atchison, Hiawatha, Waterville, Weston, Leavenworth,

64 MILES THE SHORTEST!

To Kansas City, Fort Scott, Lawrence, Ottawa,

Garnett, Iola, Humboldt, Topeka, Burlingame, Emporia, Manhattan, Fort Riley, Junction City, Salina, Ellsworth, Hays, Sheridan, Olathe, Paola, Cherokee Neutral Lands, Baxter Springs, Santa Fe, New Mexico, and all Points on the KANSAS PACIFIC, and MISSOURI RIVER, FT. SCOTT & GULF R. R's, with which we connect at Kansas City Union Depot.

THIS BEING THE SHORTEST LINE AND QUICKEST, is consequently the cheapest; and no one that is posted thinks of taking any other Route from Chicago to reach principal points in

Missouri, Kansas, Indian Territory, or New Mexico.

DAILY OVERLAND STAGES from west end Kansas Pacific Railway, for Pueblo, Santa Fe, Denver, and points in Colorado and New Mexico.

This is also a most desirable Route, via St. Joseph, to Brownsville, Nebraska City, Council Bluffs, and Omaha, connecting with the Union Pacific Railroad for Cheyenne, Denver, Salt Lake, Sacramento, San Francisco, and the Pacific coast.

Through Tickets for Sale at all Ticket Offices. Baggage Checked Through, and Omnibus Transfers and Ferriage avoided.

P. B. GROAT, Gen. Ticket Agent. HANNIBAL, Mo.
GEO. H. NETTLETON, Gen. Supt. HANNIBAL, Mo.

Old, Reliable, Air-Line Route!

CHICAGO, ALTON & ST. LOUIS R. R.

SHORTEST, QUICKEST AND ONLY DIRECT ROAD TO

Bloomington, Springfield, Jacksonville, Alton,

— AND —

ST. LOUIS!

WITHOUT CHANGE OF CARS.

THE ONLY ROAD MAKING IMMEDIATE CONNECTIONS AT ST. LOUIS, WITH MORNING AND EVENING TRAINS;

—FOR—

ATCHISON, LEAVENWORTH, KANSAS CITY,

Lawrence, Topeka, Memphis, New Orleans,

And All Points South and Southwest.

☞ TRAINS leave Chicago from the West-side Union Depot, near Madison Street Bridge. ☜

EXPRESS MAIL, [Except Sundays]	8:10 A. M.
LIGHTNING EXPRESS, [Except Saturdays and Sundays]	9:50 P. M.
NIGHT EXPRESS, [Daily]	6:00 P. M.
JOLIET ACCOMMODATION, [Except Sundays]	4:40 P. M.
JACKSONVILLE EXPRESS, [Daily]	6:00 P. M.

Trains arrive at Chicago at 8.00 P. M., 8.30 A. M. and 6:00 A. M. Joliet Accom., 9.40 A. M.

This is the ONLY LINE Between CHICAGO & ST. LOUIS RUNNING

Pullman's Palace Sleeping and Celebrated Dining Cars!

BAGGAGE CHECKED THROUGH.

Through Tickets can be had at the Company's office, No. 55 Dearborn street, Chicago, or at the Depot, corner of West Madison and Canal streets, and at all principal Ticket Offices in the United States and Canada. Rates of Fare and Freights as low as by any other Route.

A. NEWMAN, Gen. Pass. Agent. **J. C. McMULLIN, Gen. Supt.**

North Missouri R. R.

PASSENGERS FOR

KANSAS AND THE WEST,

ARE REMINDED THAT

THE NORTH MISSOURI R. R.

— IS —

11 MILES SHORTER than any other Route!

BETWEEN

St. Louis and Kansas City.

15 Miles Shorter between ST. LOUIS and LEAVENWORTH

— AND —

49 MILES SHORTER TO ST. JOSEPH!

THAN ANY OTHER LINE OUT OF ST. LOUIS.

☞ Three Through Express Trains Daily! ☜

Pullman's Celebrated Palace Sleeping Cars on all Night Trains!

☞ FOR TICKETS, apply at all Railroad Ticket Offices, and see that you get your Tickets via St. Louis and North Missouri Railroad.

C. N. PRATT, Gen. Eastern Agt., 111 Dearborn-st. CHICAGO.
S. H. KNIGHT, Gen. Superintendent, ST. LOUIS.

JAS. CHARLTON, Gen. Pass. and Ticket Agt., St. Louis.

Pacific Railroad of Missouri.

THE MOST DIRECT AND RELIABLE ROUTE FROM ST. LOUIS THROUGH TO

KANSAS CITY, LEAVENWORTH & ATCHISON,

☞ WITHOUT CHANGE OF CARS! ☜

Close Connections at KANSAS CITY with Missouri Valley, Missouri River, Ft. Scott & Gulf, and Kansas Pacific R'ys, for Weston, St. Joseph, Junction City, Fort Scott, Lawrence, Topeka, Sheridan, Denver, Fort Union, Santa Fe, and

ALL POINTS WEST!

☞ At SEDALIA, WARRENSBURG and PLEASANT HILL, with Stage Lines for Warsaw, Quincy, Bolivar, Springfield, Clinton, Osceola, Lamar, Carthage, Granby, Neosho, Baxter Springs, Fort Gibson, Fort Smith, Van Buren, Fayetteville, Bentonville.

PALACE SLEEPING CARS on all NIGHT TRAINS.

Baggage Checked Through Free!

THROUGH TICKETS for sale at all the Principal Railroad Offices in the United States and Canadas. **Be Sure and Get your Tickets over the PACIFIC R. R. OF MISSOURI.**

W. B. HALE, Gen. Pass. and Ticket Agt.
THOS. McKISSOCK, General Superintendent.

LAKE SHORE
—AND—
MICHIGAN SOUTHERN R.W.

THE GREAT THROUGH LINE BETWEEN

CHICAGO, BUFFALO & NEW YORK,

WITHOUT CHANGE!

AND THE ONLY RAILWAY

RUNNING PALACE COACHES THROUGH!

—BETWEEN—

CHICAGO & NEW YORK, via BUFFALO

☞ WITHOUT TRANSFER OF PASSENGERS! ☜

All Trains Stop at Twenty-Second Street to Take and Leave Passengers. Baggage Checked at that Station for all Points East.

4 EXPRESS TRAINS DAILY, [Sundays Excepted,] Leave Chicago from the New Depot, on Van Buren St., at the head of La Salle Street, as follows

7:30 A. M. MAIL TRAIN.
VIA OLD ROAD AND AIR LINE. SUNDAYS EXCEPTED.

Leaves 21st Street 7:45 A. M. Stops at all Stations. **Arrives**—Toledo, 6:20 P. M.

11:30 A. M. SPECIAL NEW YORK EXPRESS,
A AIR LINE. SUNDAYS EXCEPTED.

Leaves—Twenty-Second Street, **11:45 A. M. Arrives**—Elkhart, 2:55 P. M.; Cleveland 10:40 P. M.; Buffalo, 4:10 A. M.; New York, 5:30 P. M.; (Chicago Time) Boston, 11:45 P. M.

This Train has PALACE SLEEPING COACH Attached, Running

THROUGH TO ROCHESTER, WITHOUT CHANGE!

IN DIRECT CONNECTION WITH

Wagner's Celebrated Drawing-Room Coaches on N. Y. Central R. R.

Only Thirty Hours, Chicago to New York!

5:15 P. M. ATLANTIC EXPRESS (Daily),
VIA OLD ROAD.

Leave—Twenty-Second Street **5:30 P. M. Arrives**—Laporte, 8:10 P. M. (Stops 20 minutes or Supper); arrives at Toledo, 2:50 A. M.; Cleveland, 7:25 A. M. (20 minutes for Breakfast); arrives at Buffalo, 1:50 P. M.; Rochester, 5:10 P. M. (20 minutes for Supper); connects with **Sleeping Coach running Through from Rochester to Boston Without Change,** making but **One Change between Chicago and Boston.**

NEW AND ELEGANT SLEEPING COACH Attached to this Train, Running THROUGH from CHICAGO TO NEW YORK WITHOUT CHANGE! Arrives at NEW YORK, 6:40 A. M.

9:00 P. M. NIGHT EXPRESS
VIA AIR LINE. (DAILY EXCEPT SAT. & SUN.)

Leaves—Twenty-Second Street, **9:15 P. M. Arrives**—Toledo, 6:00 A. M. (20 minutes for Breakfast); arrives at Cleveland, 10:35 A. M.; Buffalo, 5:30 P. M.; New York, 11:00 A. M.; Boston, 3:50 P. M.

KALAMAZOO DIVISION.

Leave Chicago 11:30 A. M. Arrive at Kalamazoo 5:30 P. M.; Grand Rapids, 8:15 P. M.

Leave Chicago 9:00 P. M. Arrive at Kalamazoo 7:10 A. M.; Grand Rapids, 10:20 A. M.

Elkhart Accommodation leaves Chicago, 3:30 P. M. Arrives at Elkhart, 8:20 P. M.

☞ There being no heavy grades to overcome, or mountains to cross, the road bed and track being the smoothest and most perfect of any railway in the United States, this Company run their trains at a high rate of speed with perfect safety.

☞ Travelers who wish to SAVE TIME and make SURE CONNECTIONS, purchase Tickets via

LAKE SHORE & MICHIGAN SOUTHERN R'Y.

THE ONLY LINE RUNNING THROUGH BETWEEN CHICAGO AND BUFFALO, WITHOUT TRANSFER, and in Direct Connection with NEW YORK CENTRAL RAILROAD and ERIE RAILWAY.

General Ticket Office for Chicago, No. 56 Clark Street.

CHAS. F. HATCH,
General Superintendent, Cleveland, Ohio

F. E. MORSE,
General Western Passenger Agent, Chicago.

ILLINOIS CENTRAL RAILROAD.

PASSENGER TRAINS LEAVE CHICAGO FROM THE GREAT CENTRAL DEPOT, FOOT OF LAKE ST

ST. LOUIS AND CHICAGO
THROUGH LINE.

9:30 A. M. DAY EXPRESS Sundays Ex
Arriving in ST. LOUIS at 10:15 P. M.

☞ This Train Reaches St. Louis ONE HOUR & FIFTEEN MINUTES in Advance of any other Route! ☜

8:30 P. M. FAST LINE. Saturdays Excepted.
Arriving at ST. LOUIS at 8:00 A. M.

AT ST. LOUIS, Direct Connections are Made FOR

Jefferson City, Sedalia, Pleasant Hill, Macon, Kansas City,

LEAVENWORTH, ST. JOSEPH & ATCHISON,

—Connecting at KANSAS CITY for—

LAWRENCE, TOPEKA, JUNCTION CITY, SALINA, SHERIDAN, &c.

CAIRO, MEMPHIS AND NEW ORLEANS LINE.

9:30 A. M. CAIRO MAIL, Sundays Excepted.
Arriving at **Cairo** 2:20 A. M., **Memphis** 12:40 P. M., **Mobile** 9:40 A. M **Vicksburg** 9:30 A. M., **New Orleans** 11:10 A. M.

8:30 P. M. CAIRO EXPRESS, Except Saturdays.
Arriving at **Cairo** 3:15 P. M., **Memphis** 2:30 A. M., **Vicksburg** 5:00 P. M., **New Orleans** 1:30 A. M.

4:55 P. M. CHAMPAIGN PASSENGER,
Arriving at **Champaign** at 11:15 P. M.

☞ THIS IS THE ONLY DIRECT ROUTE TO

Humboldt, Corinth, Grand Junction, Little Rock, Selma, Canton Grenada, Columbus, Meridian, Enterprise,

MEMPHIS, VICKSBURG, NEW ORLEANS & MOBILE.

At NEW ORLEANS, connections are made for

GALVESTON, INDIANOLA,

And all Parts of Texas.

☞ **NOTICE.—This Route is from 100 to 150 MILES SHORTER, and from 12 to 24 HOURS QUICKER than any other.**

THIS IS ALSO THE ONLY DIRECT ROUTE TO

DECATUR, TERRE HAUTE, VINCENNES & EVANSVILLE.

Peoria and Keokuk Line.

9:30 A. M. KEOKUK PASSENGER, Sun. Excepted.
Arriving at **Chenoa** 3:15 P. M., **El Paso** 4:05 P. M., **Peoria** 5:40 P. M., **Canton** 7:14 P. M., **Bushnell** 8:59 P. M., **Keokuk** 11:26 P. M., **Warsaw** 12:05 A. M.

Elegant Drawing Room Sleeping Cars

ATTACHED TO ALL NIGHT TRAINS.

Spacious and Fine Saloon Cars!

WITH ALL MODERN IMPROVEMENTS, RUN UPON ALL TRAINS.

BAGGAGE CHECKED THROUGH TO ALL IMPORTANT POINTS.

☞ For Through Tickets, Sleeping Car Berths, Baggage Checks, and information, apply at the office of the Company in the Great Central Depot, foot of Lake St.

Hyde Park and Oakwoods Train.

	LEAVE	ARRIVE		LEAVE	ARRIVE
HYDE PARK TRAIN,...	*6:20 A. M.	*7.45 A. M.	HYDE PARK TRAIN,....	*3:00 P. M.	*5:15 P. M.
HYDE PARK TRAIN...	*8:00 A. M.	*9.15 A. M.	HYDE PARK TRAIN,....	*6:10 P. M.	*7:35 P. M.
HYDE PARK TRAIN,..	*12:10 P. M.	*1:50 P. M.			

* Sundays Excepted.

W. P. JOHNSON, Gen. Pass. Agent. **M. HUGHITT, Gen. Supt.**